FX50/FXT50

Tier 4i

Operator's Manual

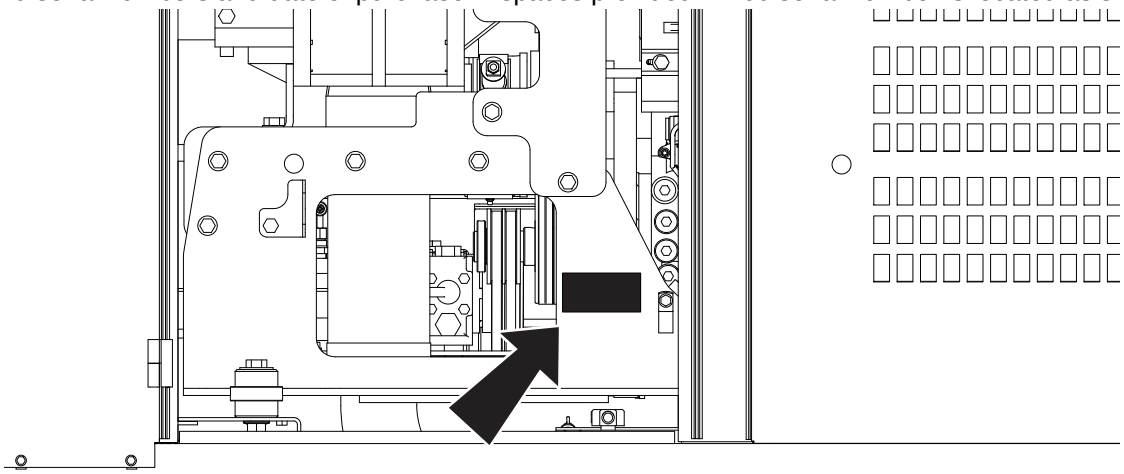
Issue 3.0 **053-2545**

Overview

Chapter Contents

Serial Number Location

Record serial numbers and date of purchase in spaces provided. FX60 serial number is located as shown.



Date of manufacture	
Date of purchase	
FX50 serial number (shown)	
Engine serial number	
Blower serial number	
Water pump serial number	
Trailer serial number	

Intended Use

The FX50 is a self-contained vacuum excavation unit capable of vacuuming a wide variety of non-hazardous, non-flammable liquid and solid debris. The FXT50 is a truck-mounted version of the FX50 vacuum excavation unit. They are designed to perform efficient soft excavation, including exposing utilities for visual verification and potholing. The optional reverse flow system allows for spoils transfer to another tank. The optional air system on the FXT50 can operate auxiliary pneumatic tools on low (100 psi/689 kPa) setting.

The FX50 and FXT50 are intended for operation in ambient temperatures from 0° to 115°F (-18° to 46°C). Use in any other way is considered contrary to the intended use.

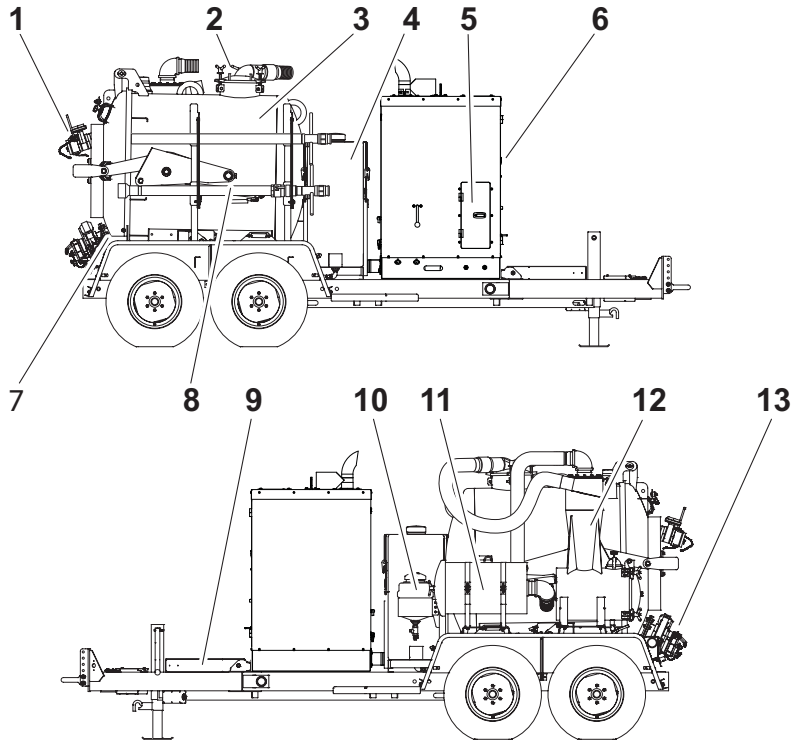
The FX50 and FXT50 should be operated, serviced, and repaired only by persons familiar with its particular characteristics and acquainted with the relevant safety procedures.

Equipment Modification

This equipment was designed and built in accordance with applicable standards and regulations. Modification of equipment could mean that it will no longer meet regulations and may not function properly or in accordance with the operating instructions. Modification of equipment should only be made by competent personnel possessing knowledge of applicable standards, regulations, equipment design functionality/requirements and any required specialized testing.

FX50 Unit Components

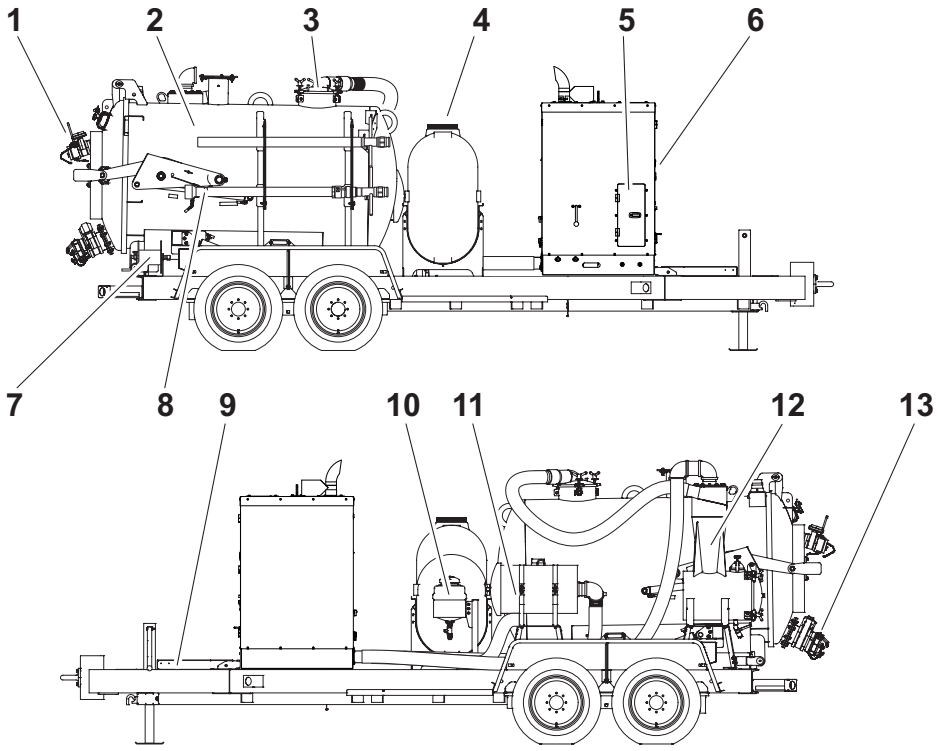
300-Gal (1136-L) Tank



j36om075w.eps

1. Inlet valve
2. Vacuum tank
3. Primary shut-off valve
4. Water tank
5. Operator's station
6. Power unit
7. Hose reel
8. Potholing tools
9. Tool storage
10. Antifreeze tank
11. Vacuum filter
12. Cyclonic separator
13. Drain/outlet valve

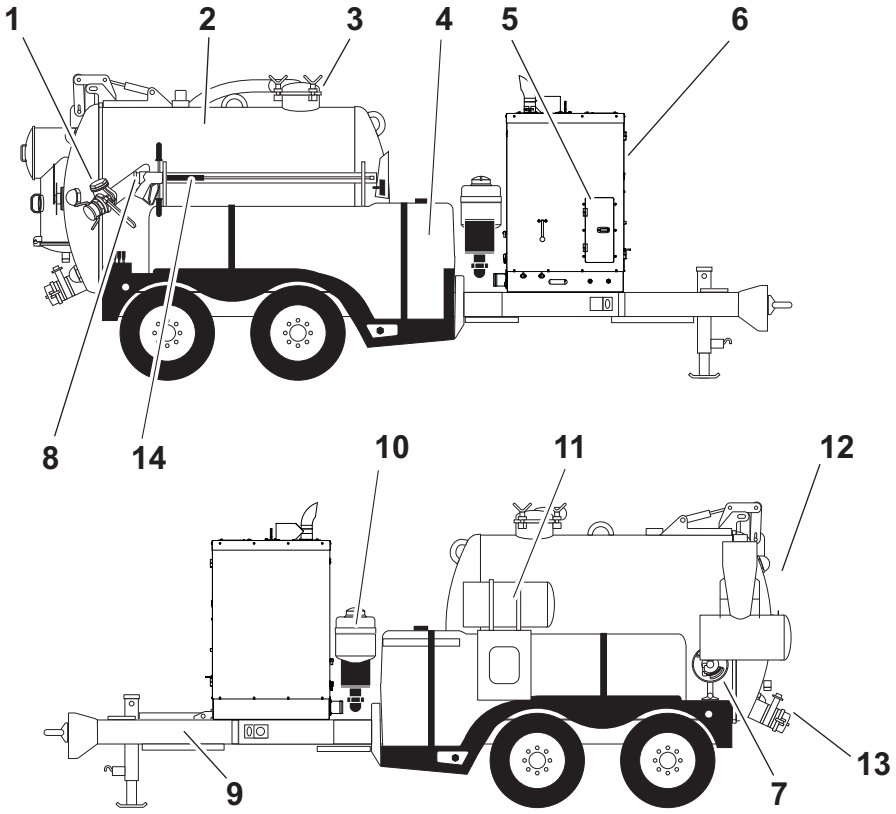
800-Gal (3028-L) Tank



j36om002w.eps

1. Inlet valve
2. Vacuum tank
3. Primary shut-off valve
4. Water tank
5. Operator's station
6. Power unit
7. Hose reel
8. Potholing tools
9. Tool storage
10. Antifreeze tank
11. Vacuum filter
12. Cyclonic separator
13. Drain/outlet valve

1200-Gal (4542-L)Tank

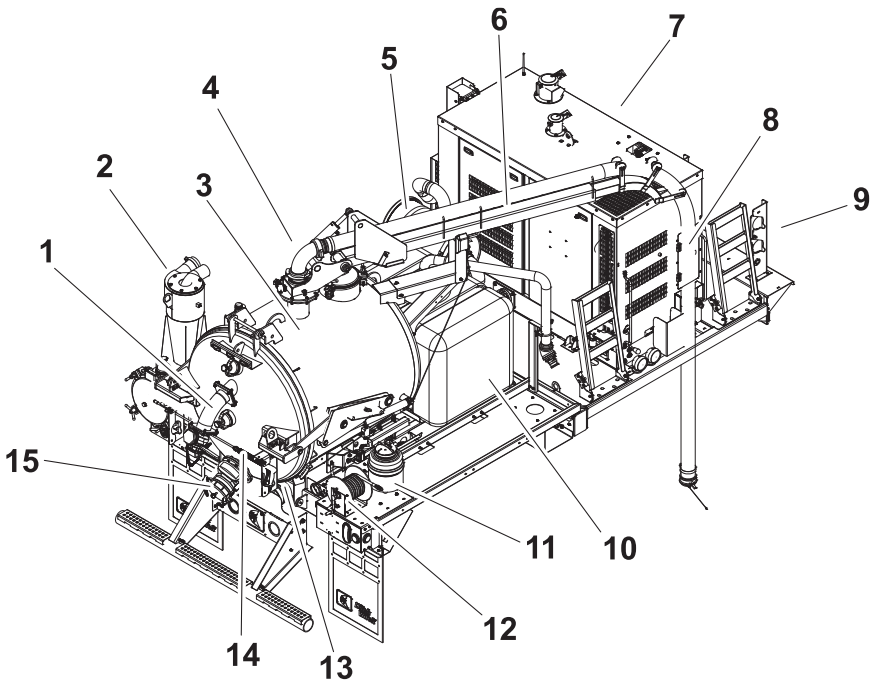


j36om080w.eps

1. Inlet valve
2. Vacuum tank
3. Primary shutoff valve
4. Water tanks
5. Operator's station
6. Power unit
7. Hose reel
8. Potholing tools
9. Tool storage
10. Antifreeze tank
11. Vacuum filter
12. Cyclonic separator
13. Drain/Outlet valve
14. Water lance

FXT50 Unit Components

500-Gal (1893-L) Tank



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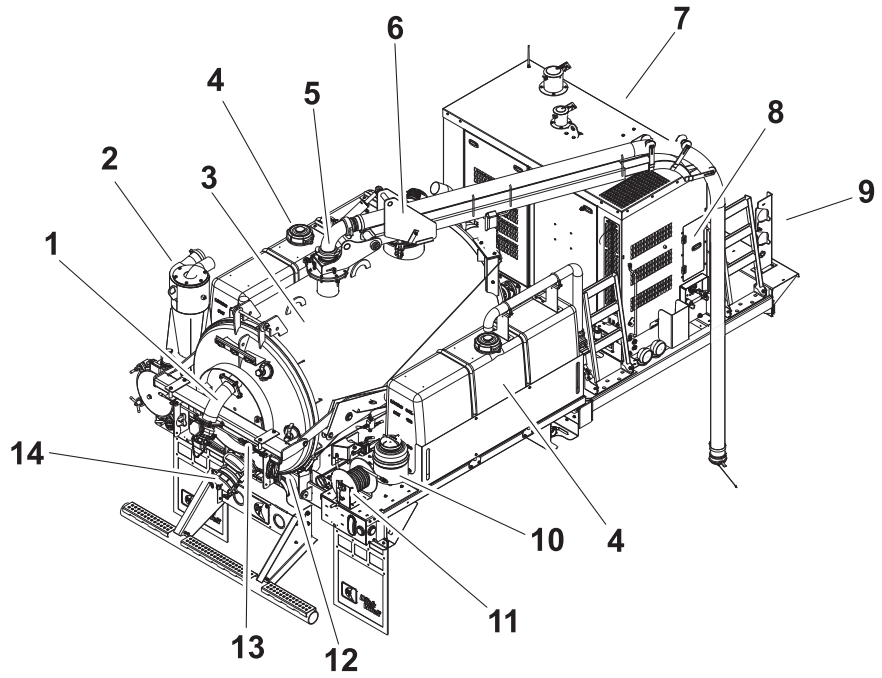
1. Inlet valve
2. Cyclonic filter
3. Vacuum tank
4. Primary shutoff valve
5. Vacuum filter/secondary shutoff valve
6. Vacuum boom (optional)
7. Power pack
8. Operator's station
9. Tool storage (optional)
10. Water tank
11. Antifreeze tank
12. Hose reel
13. Tool storage
14. Water lance
15. Drain/Outlet valve

800-Gal (3028-L) Tank



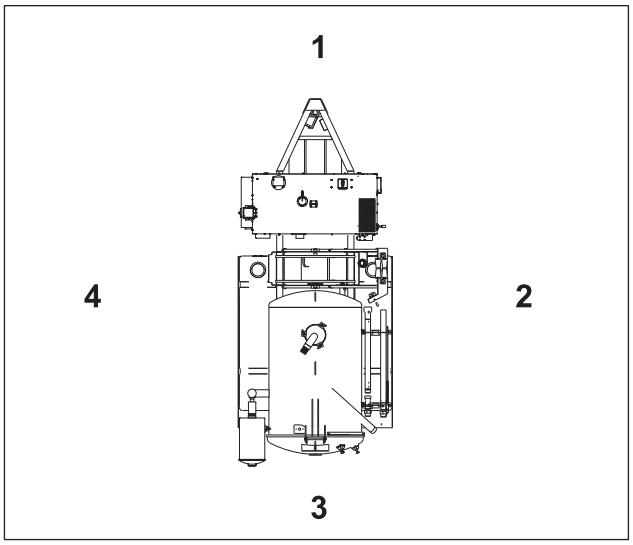
j44om018h.eps

1. Inlet valve
2. Cyclonic filter
3. Vacuum tank
4. Water tanks
5. Primary shutoff valve
6. Vacuum boom (optional)
7. Power pack
8. Operator's station
9. Tool storage (optional)
10. Antifreeze tank
11. Vacuum hose reel
12. Tool storage
13. Water lance
14. Drain/Outlet valve

Operator Orientation

1. Front of unit
2. Right of unit
3. Rear of unit
4. Left of unit

Right and left sides of machine are determined by facing towing vehicle.



j43om004h.eps

About This Manual

This manual contains information for the proper use of this machine. See **Operation Overview** for basic operating procedures. Cross references such as "See page 50" will direct you to detailed procedures.

Bulleted Lists

Bulleted lists provide helpful or important information or contain procedures that do not have to be performed in a specific order.

Numbered Lists

Numbered lists contain illustration callouts or list steps that must be performed in order.

Foreword

This manual is an important part of your equipment. It provides safety information and operation instructions to help you use and maintain your Ditch Witch® equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference. If you sell your equipment, be sure to give this manual to the new owner.

If you need a replacement copy, contact your Ditch Witch dealer. If you need assistance in locating a dealer, visit our website at **www.ditchwitch.com** or write to the following address:

The Charles Machine Works, Inc.
Attn: Marketing Department
PO Box 66
Perry, OK 73077-0066
USA

The descriptions and specifications in this manual are subject to change without notice. The Charles Machine Works, Inc. reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on Ditch Witch equipment, see your Ditch Witch dealer.

Thank you for buying and using Ditch Witch equipment.

Reporting Safety Defects

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying The Charles Machine Works, Inc, Attn: Product Safety Coordinator.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in any individual problems between you, your Ditch Witch dealer, or The Charles Machine Works, Inc.

To contact NHTSA you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (366-0123 in Washington, DC area) or write to:

NHTSA
U.S. Department of Transportation
400 7th Street SW (NSA-11)
Washington, DC 20590

You can also obtain other information about motor vehicle safety from the Hotline.

FX50/FXT50 Tier 4i
Operator's Manual

This manual covers the following models: FX50 Tier 4i, FXT50 Tier 4i.

Issue number 3.0/OM-2/17
Part number 053-2545

Contents

Safety

Chapter Contents

Guidelines

When you see this safety alert sign, carefully read and follow all instructions.
YOUR SAFETY IS AT STAKE. Read this entire section before using your equipment.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- Wear personal protective equipment.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety videos are available from your Ditch Witch® dealer or at www.ditchwitch.com/safe. Safety Data Sheets (SDS) are available at www.ditchwitch.com/support.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety signs. Contact your Ditch Witch dealer for assistance.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas may be present.
- Only operate equipment in well-ventilated areas.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.
- Complete the equipment checklist located at www.ditchwitch.com/safe.

California Proposition 65 Warning

This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

- battery posts, terminals and related accessories
- engine exhaust
- ethylene glycol

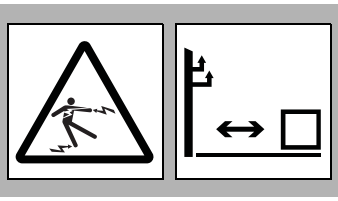
Emergency Procedures

WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

Before operating any equipment, review emergency procedures and check that all safety precautions have been taken.

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button (if equipped).

Electric Strike Description



DANGER Electric shock will cause death or serious injury. Stay away. 274-049

When working near electric cables, remember the following:

- Electricity follows all paths to ground, not just path of least resistance.
- Pipes, hoses, and cables will conduct electricity back to all equipment.
- Low voltage current can injure or kill. Many work-related electrocutions result from contact with less than 440 volts.

Most electric strikes are not noticeable, but indications of a strike include:

- power outage
- smoke
- explosion
- popping noises
- arcing electricity

If any of these occur, assume an electric strike has occurred.

If an Electric Line is Damaged

If you suspect an electric line has been damaged and you are **on truck or trailer**, DO NOT MOVE. Remain on truck or trailer and take the following actions. The order and degree of action will depend on the situation.

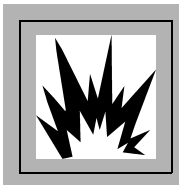
- Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
- Do not allow anyone into area until given permission by utility company.
- Do not allow anyone to touch equipment.

If you suspect an electric line has been damaged and you are **off truck or trailer**, DO NOT TOUCH EQUIPMENT. Take the following actions. The order and degree of action will depend on the situation.

- LEAVE AREA. The ground surface may be electrified so take small shuffle steps with feet close together to reduce the hazard of being shocked from one foot to the other.
- Contact utility company to shut off power.
- Do not return to area or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged


WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark. 275-419 (2P)



WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

If you suspect a gas line has been damaged, take the following actions. The orders and degree of action will depend on the situation.

- Immediately shut off engine(s), if this can be done safely and quickly.
- Remove any ignition source(s), if this can be done safely and quickly.
- Warn others that a gas line has been cut and that they should leave the area.
- Leave jobsite as quickly as possible.
- Immediately call your local emergency phone number and utility company.
- If jobsite is along street, stop traffic from driving near jobsite.
- Do not return to jobsite until given permission by emergency personnel and utility company.

If a Fiber Optic Cable is Damaged

Do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur. Contact utility company.

If Machine Catches on Fire

Perform emergency shutdown procedure and then take the following actions. The order and degree of action will depend on the situation.

- Immediately move battery disconnect switch (if equipped and accessible) to disconnect position.
- If fire is small and fire extinguisher is available, attempt to extinguish fire.
- If fire cannot be extinguished, leave area as quickly as possible and contact emergency personnel.

Safety Alert Classifications

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. YOUR SAFETY IS AT STAKE.

Watch for the three safety alert levels: **DANGER**, **WARNING** and **CAUTION**. Learn what each level means.

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

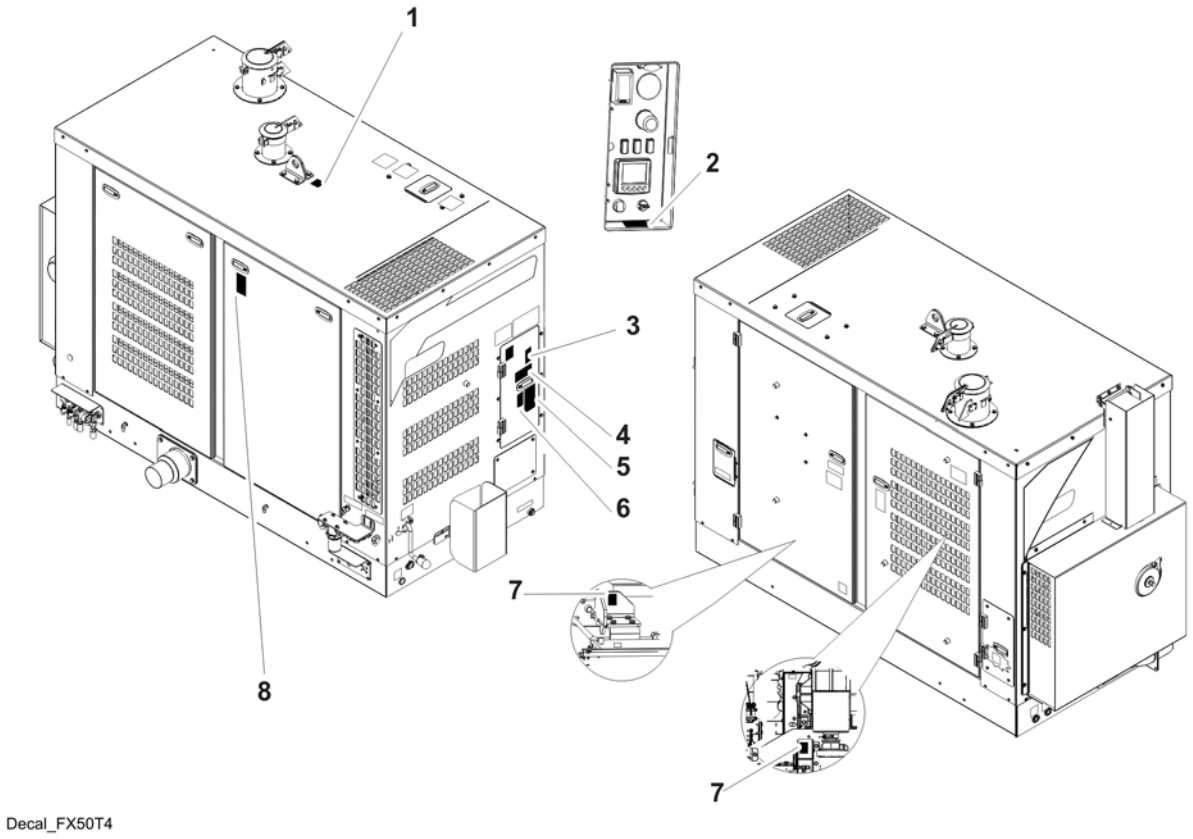
Watch for two other words: ***NOTICE*** and **IMPORTANT**.

NOTICE indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

IMPORTANT can help you do a better job or make your job easier in some way.

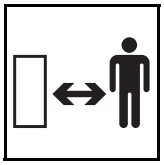
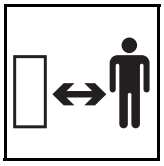
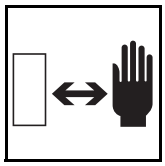
FX50T4i Machine Safety Alerts

Power Unit

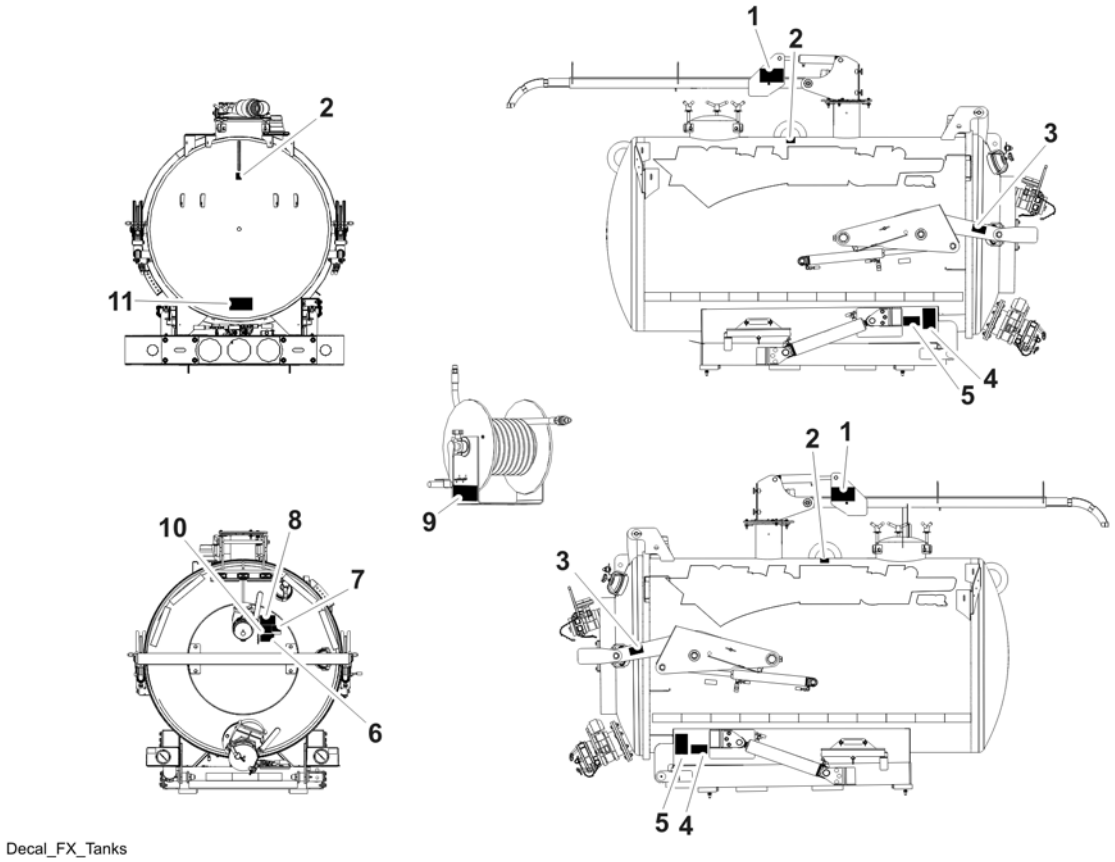


Decal_FX50T4

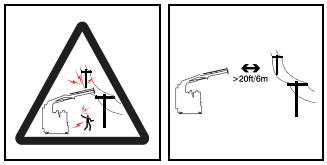
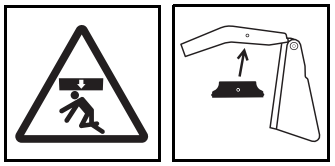
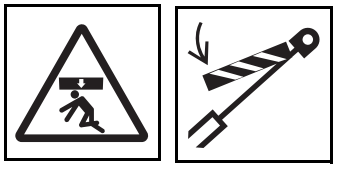
1		Lift point. See Transport chapter for more information.
2		**⚠ WARNING** Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475
3		**⚠ CAUTION** Exposure to high noise levels may cause hearing loss. Wear hearing protection. 700-009 (2-P)

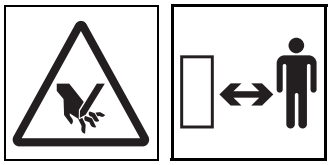
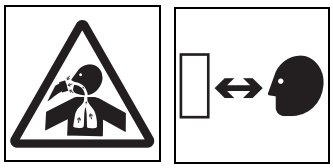
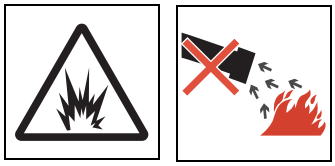
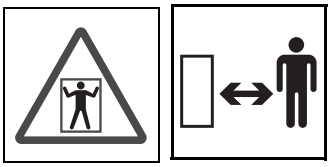
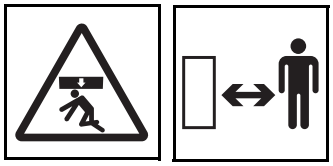
4	 	**WARNING** Incorrect boom procedures could result in serious injury or death. Lock boom before transporting or tilting. 270-1982
5	 	**CAUTION** Flying objects thrown by machine may strike people. Wear safety glasses and hard hat. 275-193
6	 	**CAUTION** Equipment can be operated by remote control. Stay away. 270-5739
7	 	**WARNING** Moving parts could cut off hand or foot. Stay away. 275-184, 273-437
8	 	**CAUTION** Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P)

800 Gallon Tanks

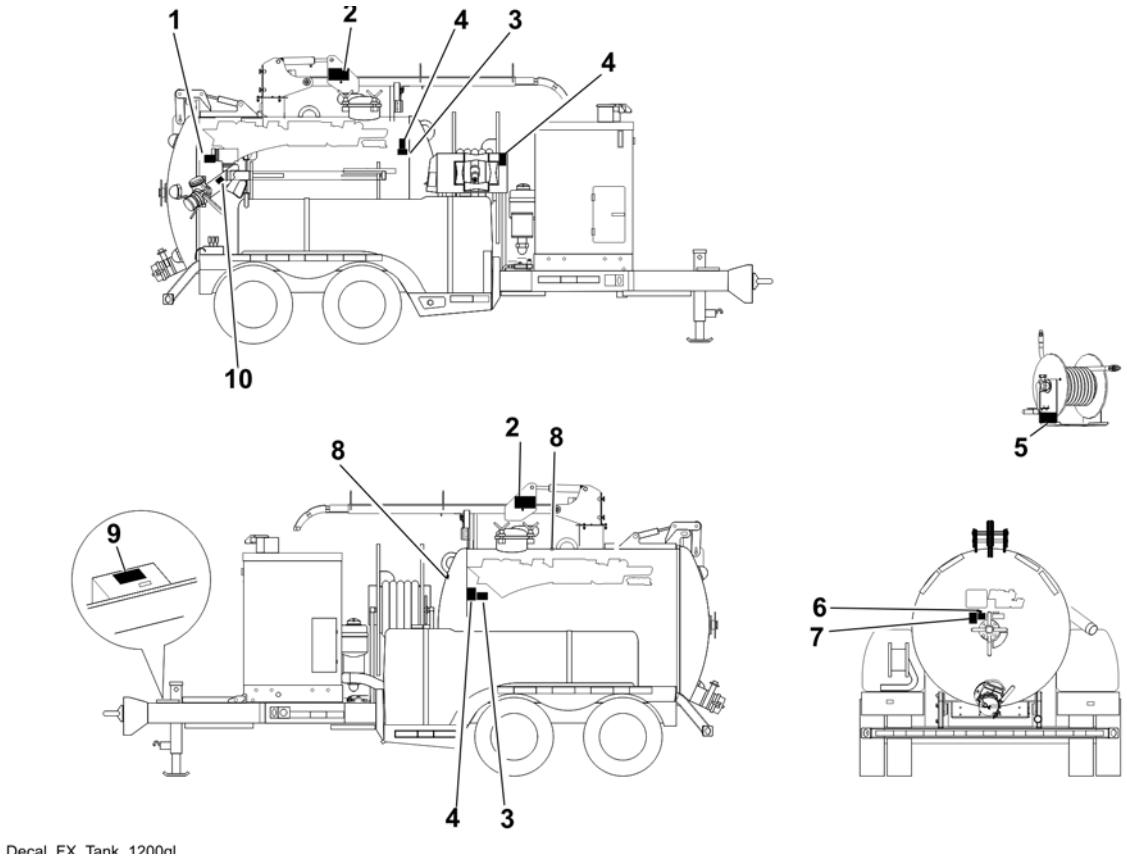


Decal_FX_Tanks

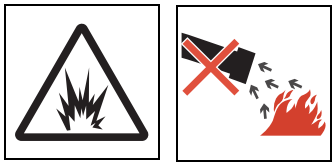
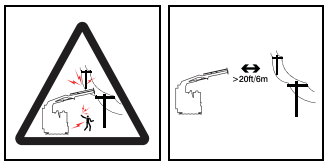
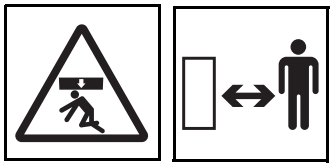
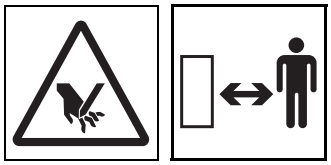
1		**DANGER** Do not get boom near power lines. Death or serious injury will occur. Keep required distance between boom and power lines. Use a spotter. 270-1983
2		Lift point. See Transport chapter for more information.
3		**WARNING** Crushing weight can cause death or serious injury. Pin door lock on linkage before servicing. 270-5216
4		**WARNING** Crushing weight. Place cylinder lock on extended cylinder and secure. 273-231

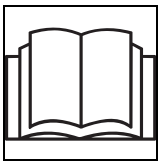
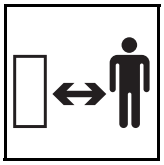
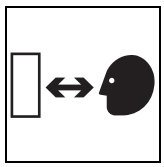
5		**WARNING** Moving parts could cut off hand or foot. Stay away. 275-184, 273-437
6		**WARNING** Contents under pressure. Relieve pressure before opening. Death or injury could occur. 270-2732
7		**DANGER** Vacuum can suffocate. Keep hose end away from face. 273-205
8		**WARNING** Fire or explosion possible. Do not vacuum flammable or combustible substances. 273-483
9		**WARNING** Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035
10		**DANGER** Confined space will cause suffocation. Use proper procedures for entering or stay away. 273-200
11		**WARNING** Crushing weight could cause death or serious injury. Stay away. 275-326

1200 Gallon Tank



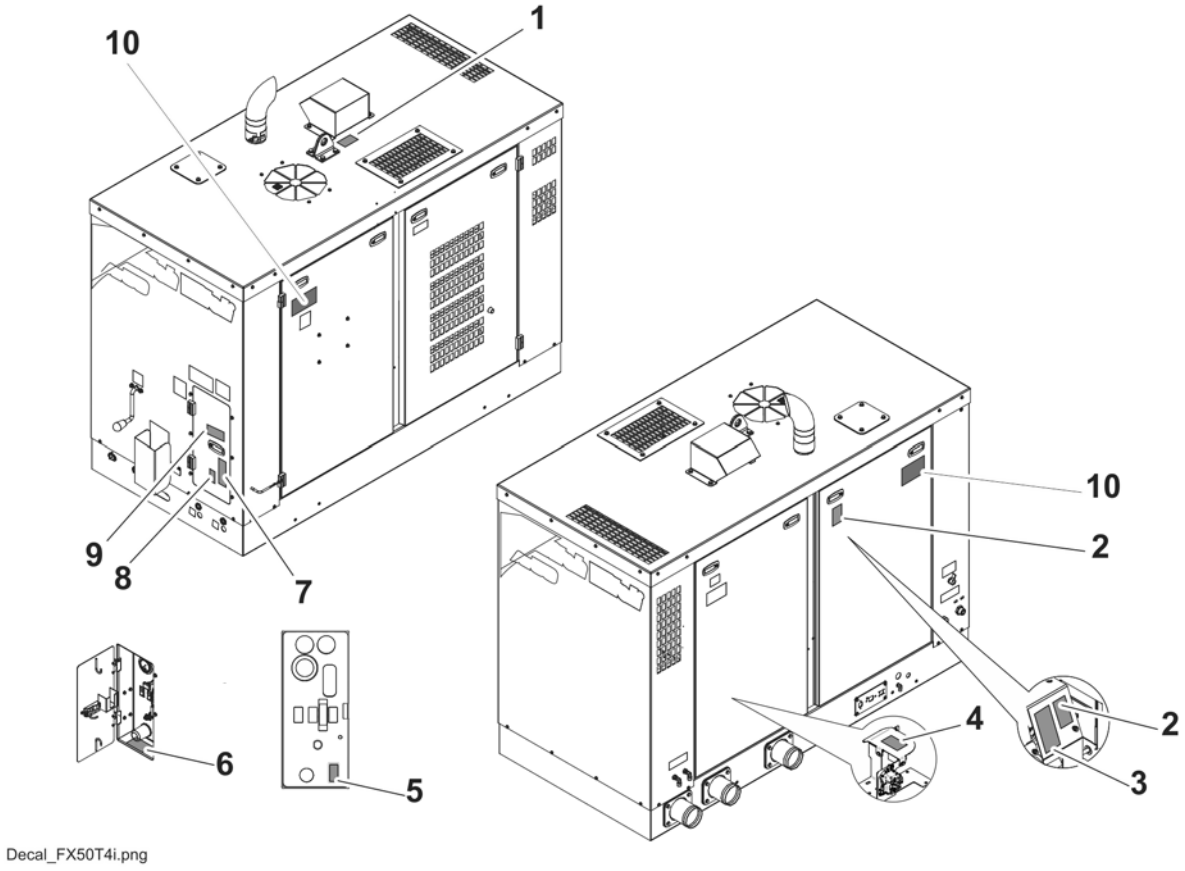
Decal FX Tank 1200gl

1		**WARNING** Fire or explosion possible. Do not vacuum flammable or combustible substances. 273-483
2		**DANGER** Do not get boom near power lines. Death or serious injury will occur. Keep required distance between boom and power lines. Use a spotter. 270-1983
3		**WARNING** Crushing weight could cause death or serious injury. Stay away. 275-326
4		**WARNING** Moving parts could cut off hand or foot. Stay away. 275-184, 273-437

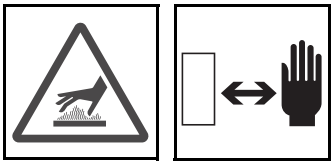
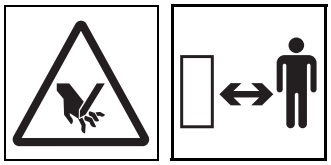
5	 	**WARNING** Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035
6	 	**WARNING** Contents under pressure. Relieve pressure before opening. Death or injury could occur. 270-2732
7	 	**DANGER** Confined space will cause suffocation. Use proper procedures for entering or stay away. 273-200
8		Lift point. See Transport chapter for more information.
9		**WARNING** 275-146 • Secure equipment and accessories with chain and binder. • Check brakes and lights prior to use. • Use proper size coupler. • Maintain adequate distance for stopping and passing vehicles. • Block wheels when parked. • Check tire condition and inflation frequently. • Failure to follow these rules may result in personal injury.
10	 	**DANGER** Vacuum can suffocate. Keep hose end away from face. 273-205

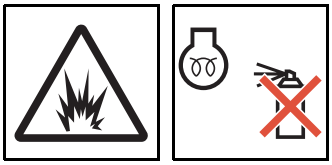
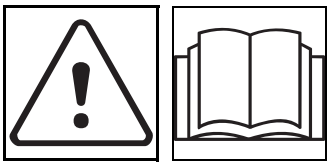
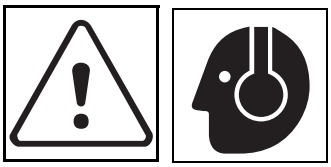
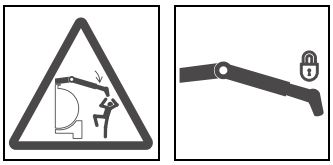
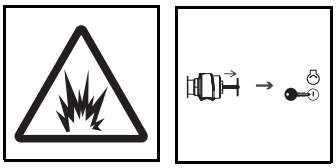
FXT50T4i Machine Safety Alerts

Power Unit

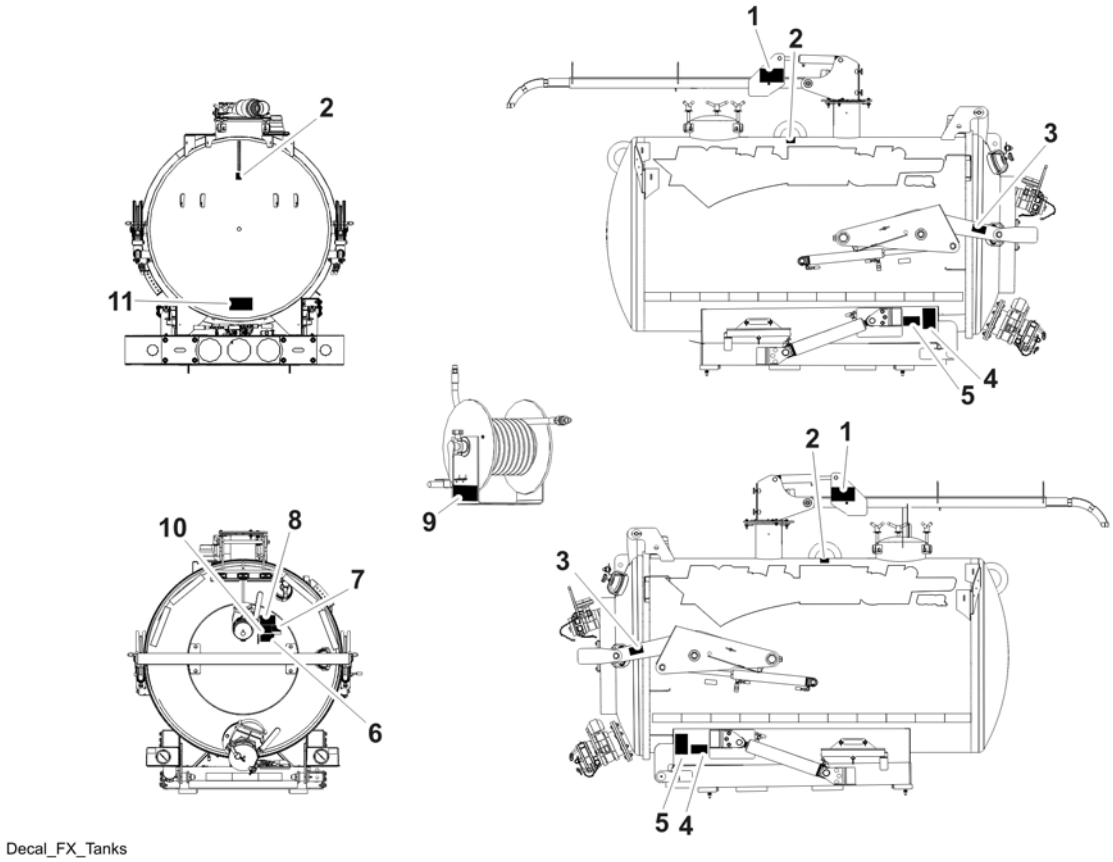


Decal_FX50T4i.png

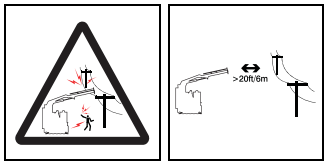
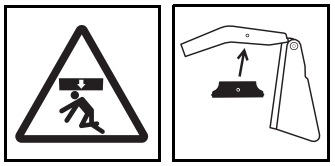
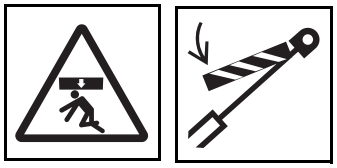
1		Lift point. See Transport chapter for more information.
2		**CAUTION** Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P)
3		**WARNING** Moving parts could cut off hand or foot. Stay away. 275-184, 273-437

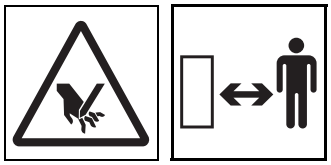
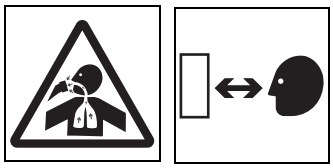
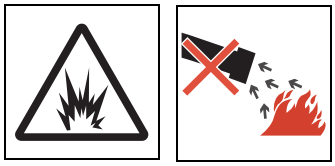
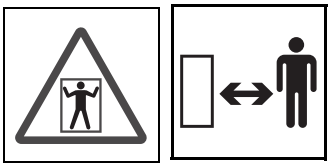
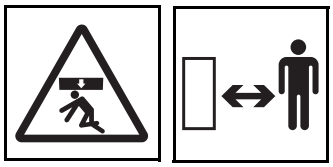
4		**WARNING** Fire or explosion possible. Do not use starter fluid. 273-459 (2P), 274-206 (2P), 700-206 (2P)
5		**WARNING** Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050; 274-724 (2P), 700-133
6		**WARNING** Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475
7		**CAUTION** Flying objects thrown by machine may strike people. Wear safety glasses and hard hat. 275-193
8		**CAUTION** Exposure to high noise levels may cause hearing loss. Wear hearing protection. 700-009 (2-P)
9		**WARNING** Incorrect boom procedures could result in serious injury or death. Lock boom before transporting or tilting. 270-1982
10		**WARNING** System may be pressurized. If over pressurized, death or serious injury can occur. Exercise and clean relief valve before each use. 270-2736

Tanks

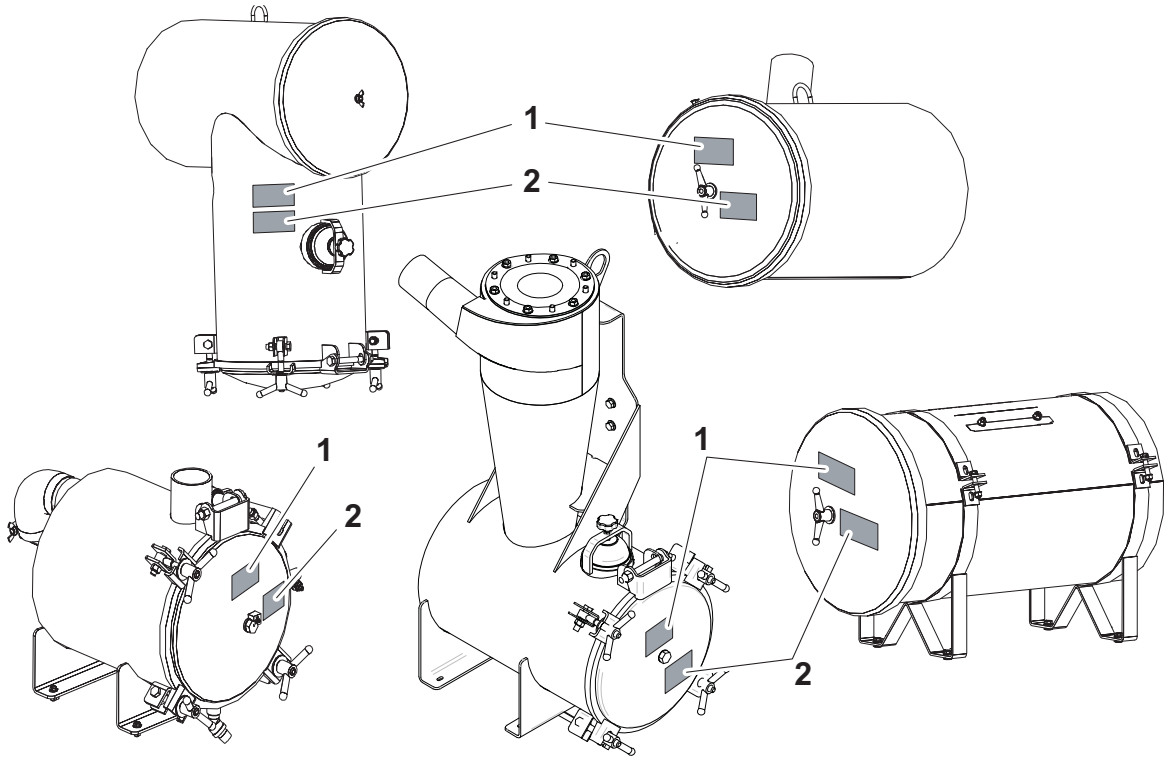


Decal_FX_Tanks

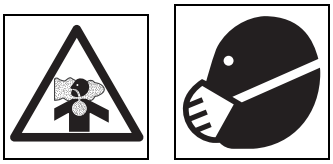
1		**DANGER** Do not get boom near power lines. Death or serious injury will occur. Keep required distance between boom and power lines. Use a spotter. 270-1983
2		Lift point. See Transport chapter for more information.
3		**WARNING** Crushing weight can cause death or serious injury. Pin door lock on linkage before servicing. 270-5216
4		**WARNING** Crushing weight. Place cylinder lock on extended cylinder and secure. 273-231

5		**WARNING** Moving parts could cut off hand or foot. Stay away. 275-184, 273-437
6		**WARNING** Contents under pressure. Relieve pressure before opening. Death or injury could occur. 270-2732
7		**DANGER** Vacuum can suffocate. Keep hose end away from face. 273-205
8		**WARNING** Fire or explosion possible. Do not vacuum flammable or combustible substances. 273-483
9		**WARNING** Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035
10		**DANGER** Confined space will cause suffocation. Use proper procedures for entering or stay away. 273-200
11		**WARNING** Crushing weight could cause death or serious injury. Stay away. 275-326

FX Filters and Cyclones Safety Alerts



FX_Filters_&_Cyclones.eps

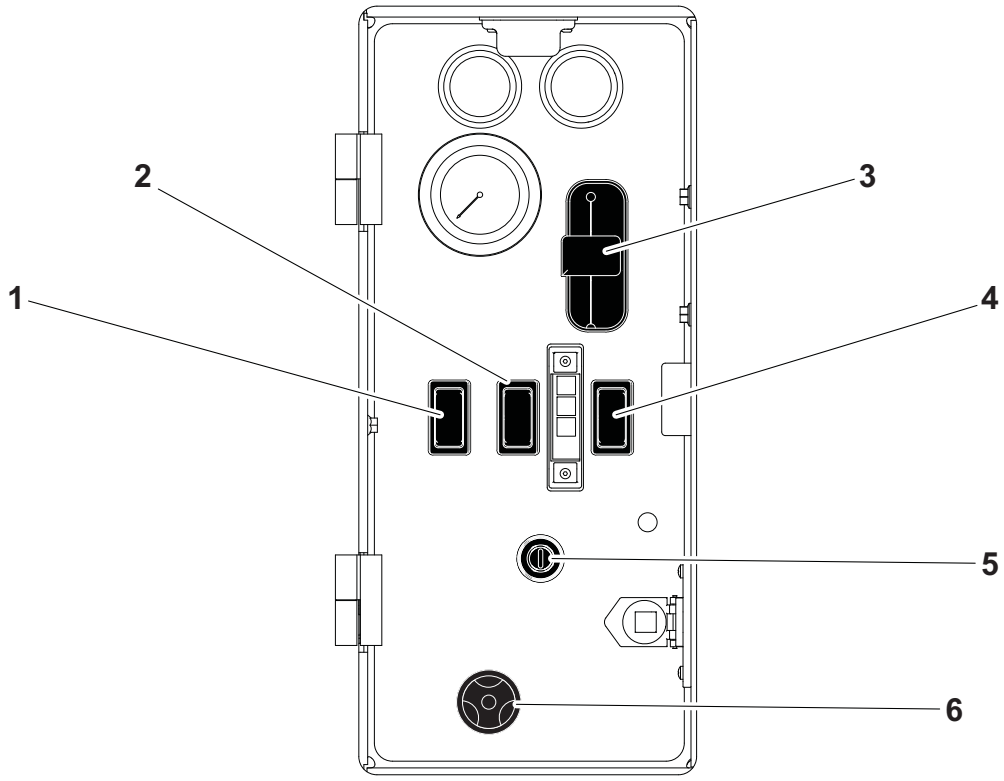
1		**WARNING** Contents under pressure. Relieve pressure before opening. Death or injury could occur. 270-2732
2		**CAUTION** Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust. 270-4952

Controls

Chapter Contents

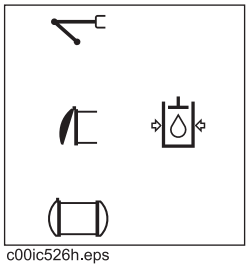
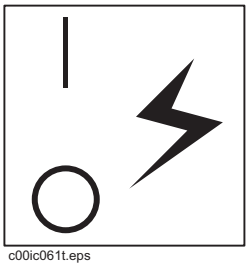
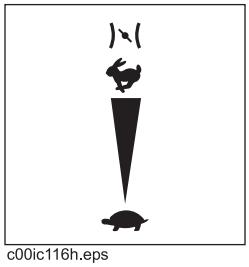
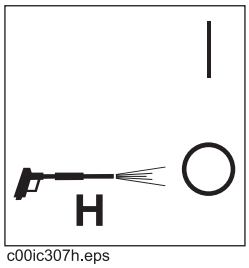
Power Pack

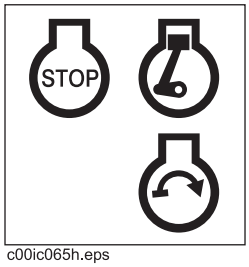
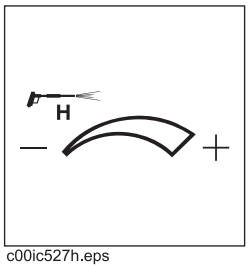
Controls and Connectors



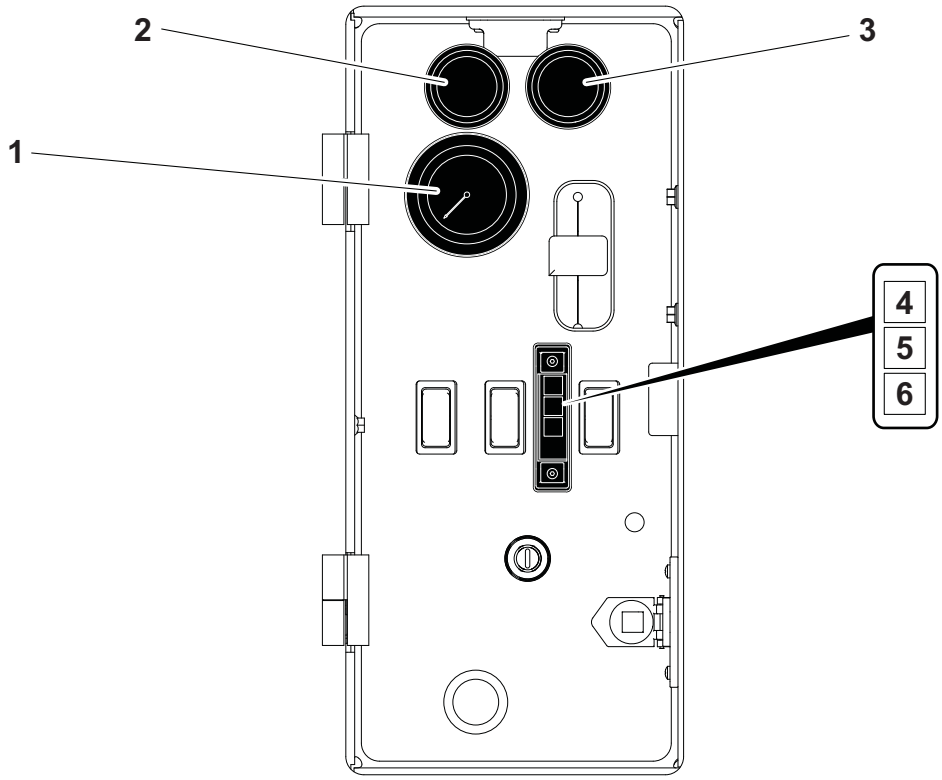
j36om016w.eps

1. Hydraulic function switch
2. Auxiliary outlet switch
3. Throttle
4. Water pressure switch
5. Ignition switch
6. Water pressure control

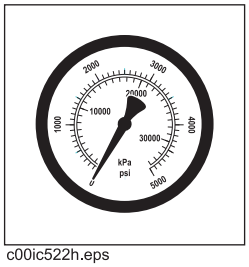
Item	Description	Notes
1. Hydraulic function switch  c00ic526h.eps	To direct hydraulic power to the optional boom function, press top. To direct hydraulic power to the door function, move to center position. To direct hydraulic power to the tank tilt function, press bottom.	
2. Auxiliary outlet switch  c00ic061t.eps	To turn on, press top. To turn off, press bottom.	**IMPORTANT:** Keep switch in off position unless in use.
3. Throttle  c00ic116h.eps	To increase engine speed, push up. To decrease engine speed, pull down.	
4. Water pressure switch  c00ic307h.eps	To turn on water pump, press top. To turn off water pump, move to center position. To bypass low water indication, press bottom. Water pump will operate for 60 seconds.	Use bypass to feed antifreeze into system when freshwater tank is empty. See "Add Antifreeze" on page 82.

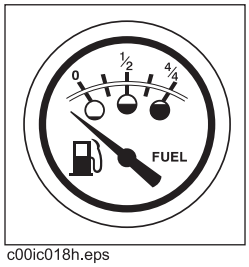
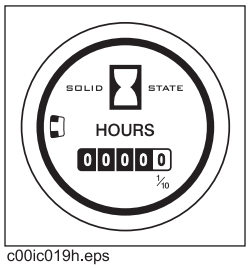
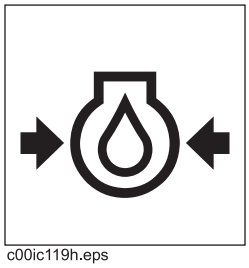
Item	Description	Notes
5. Ignition switch  c00ic065h.eps	To start engine, insert key and turn clockwise. To stop engine, turn key counterclockwise.	**IMPORTANT:** • When engine is on, blower operates and vacuum is present at tank inlet. • All indicators should light briefly at startup.
6. Water pressure control  c00ic527h.eps	To increase water pressure, turn clockwise. To decrease water pressure, turn counterclockwise.	

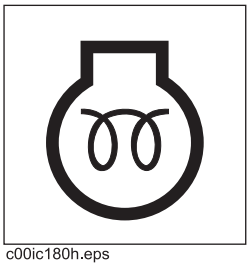
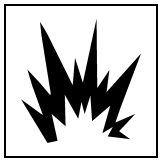
Gauges and Indicators



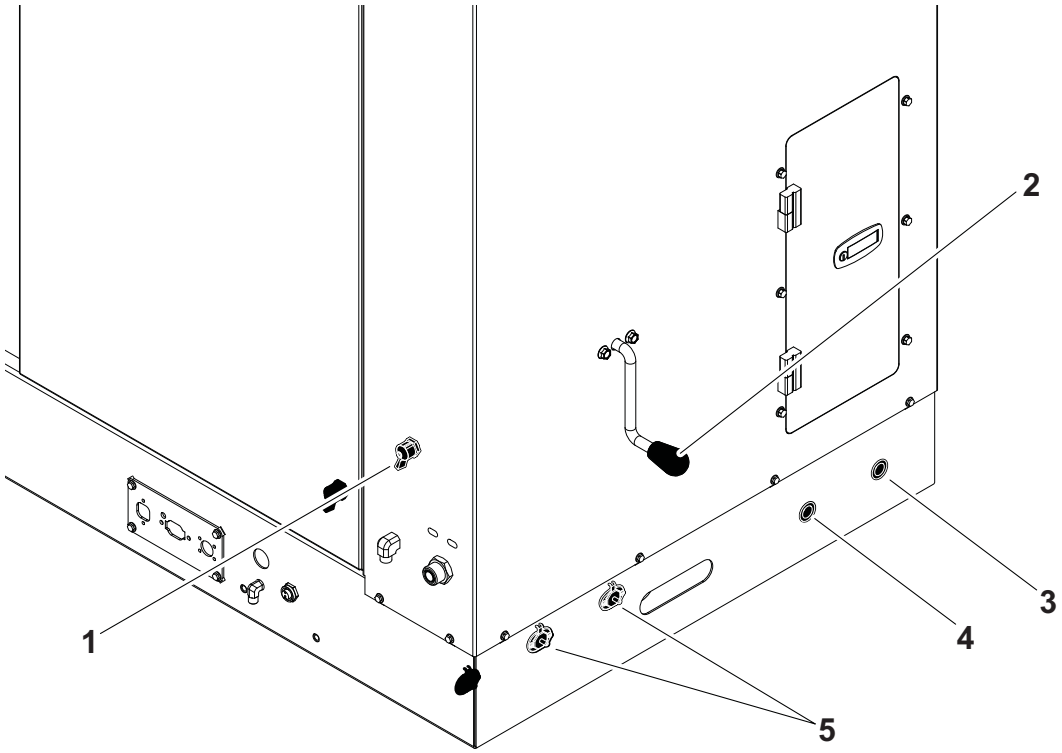
1. Water pressure gauge
2. Fuel gauge
3. Hourmeter
4. Engine oil pressure indicator
5. Engine oil temperature indicator
6. Cold start wait indicator

Item	Description	Notes
1. Water pressure gauge  c00ic522h.eps	Displays water pressure when water pressure switch is on and water lance is in use.	

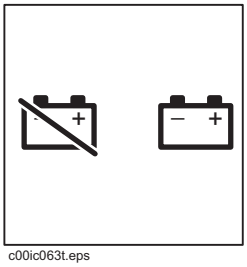
Item	Description	Notes
2. Fuel gauge  c00ic018h.eps	Displays fuel level in tank.	***NOTICE:*** Use low sulfur or ultra low sulfur diesel fuel only. In temperatures below 32° F (0° C), use #1 diesel fuel. Tank holds 19 gal (72 L).
3. Hourmeter  c00ic019h.eps	Displays engine operating time.	Hourmeter runs when ignition switch is on. Use these times to schedule service.
4. Engine oil pressure indicator  c00ic119h.eps	Indicates engine oil pressure is too low. Also lights briefly when engine is started.	Engine will stop. 1. Check oil level. 2. Check for leaks before starting engine. 3. If pressure is still low, consult engine manual.
4. Engine oil temperature indicator  c00ic120h.eps	Indicates engine oil temperature is too high.	Engine will stop. 1. Let engine cool. 2. Check fan belt tension. 3. Check engine oil level. 4. Check cooling fins for dirt and debris.

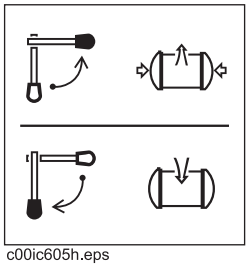
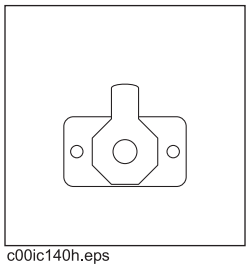
Item	Description	Notes
5. Cold start wait indicator  c00ic180h.eps	Indicates intake air preheater is operating. Wait until light goes off before starting engine. See "Cold Start Procedure" on page 57.	 **WARNING** Explosion possible. Serious injury or equipment damage could occur. **To help avoid injury**: do not use ether or starting fluid

Miscellaneous



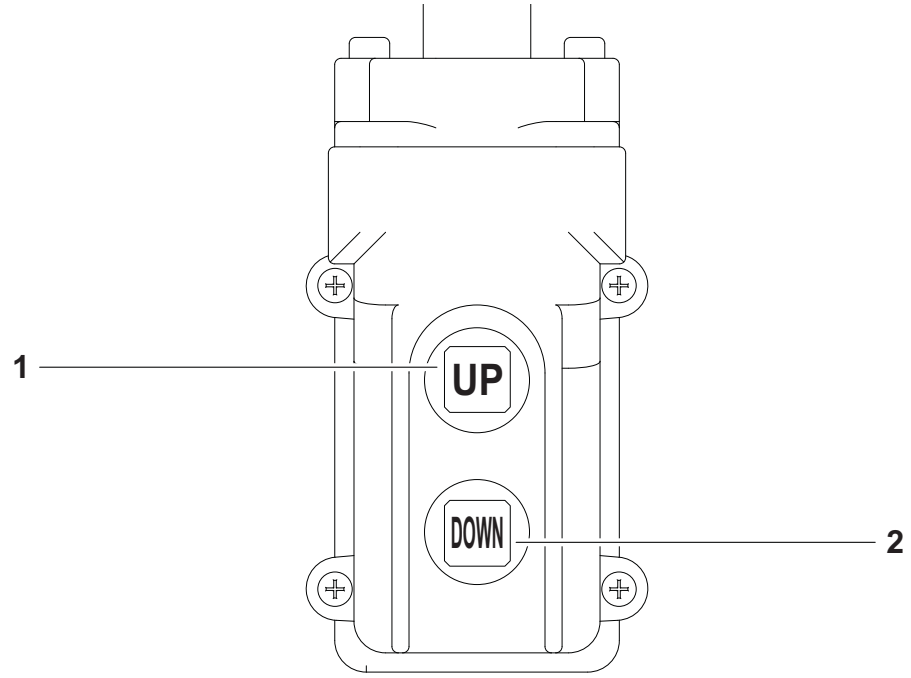
1. Battery disconnect
2. Flow direction control (optional)
3. Hydraulic fluid drain
4. Engine oil drain
5. Auxiliary outlets

Item	Description	Notes
1. Battery disconnect switch  c00ic063t.eps	To connect, turn clockwise. To disconnect, turn counterclockwise.	**IMPORTANT:** Use battery disconnect switch when servicing, welding, and during long-term storage.

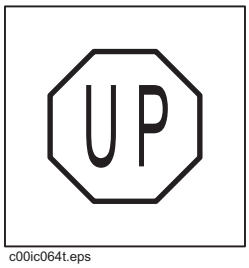
Item	Description	Notes
2. Flow direction control  c00ic605h.eps	To operate in reverse flow mode, turn counterclockwise. To operate in vacuum mode, turn clockwise.	Use reverse flow to unload tank contents to another tank. Operate in reverse flow mode only when drain/ outlet valve is open.
3. Hydraulic fluid drain	To drain: • Remove plug. • Replace plug when drain pan is empty.	
4. Engine oil drain	To drain: • Remove plug. • Replace plug when drain pan is empty.	
5. Auxiliary outlets  c00ic140h.eps	To operate work lights or other 12V devices, plug into outlet. Device can be turned on and off with auxiliary power switch.	Outlet has power only when ignition switch is on.

Tank

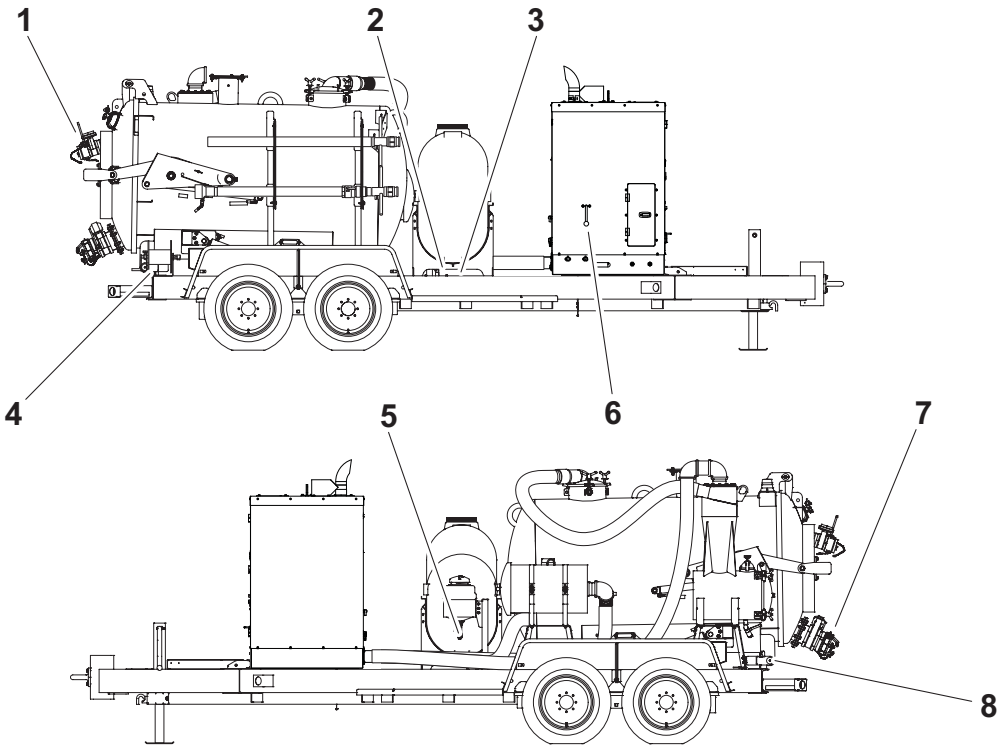
Tethered Controller



j36om018w.eps

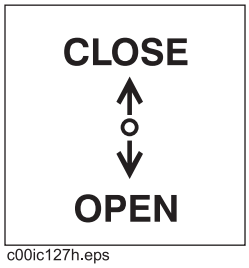
Item	Description	Notes
1. Up  c00ic064t.eps	To raise tank, set hydraulic function switch to the tank position and press UP. To open tank door, set hydraulic function switch to the door position and press UP.	**Note:** The vacuum boom uses a different tethered controller. See page 46.
2. Down  c00ic065t.eps	To lower tank, set hydraulic function switch to the tank position and press DOWN. To close tank door, set hydraulic function switch to the door position and press DOWN.	

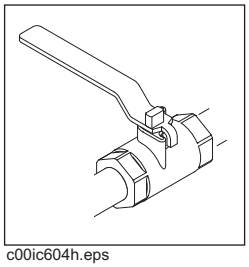
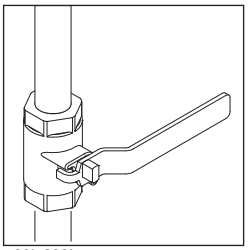
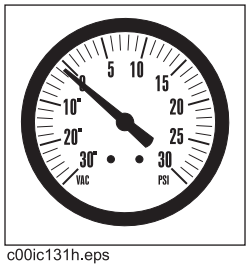
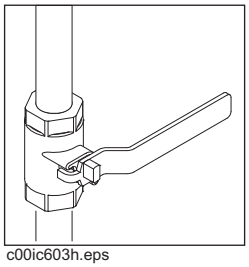
Machine Controls

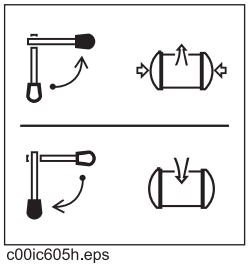
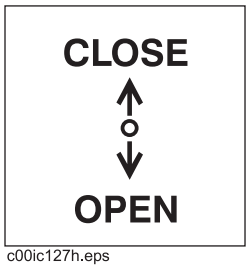
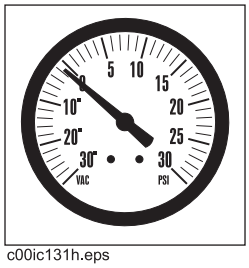


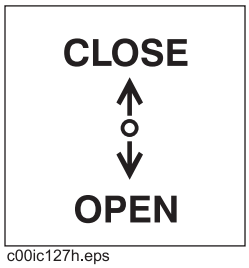
j36om005w.eps

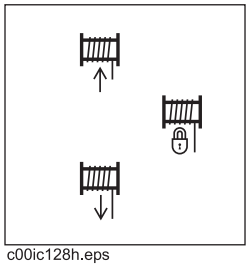
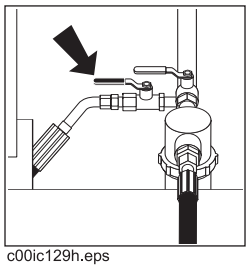
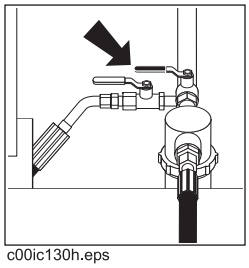
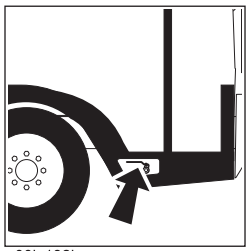
1. Inlet valve
2. Water tank drain
3. Water tank supply valve
4. Vacuum gauge
5. Antifreeze tank supply valve
6. Flow direction control (optional)
7. Drain/Outlet valve
8. Reverse flow gauge (optional)

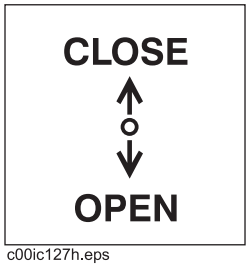
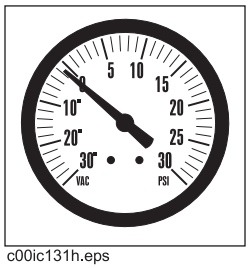
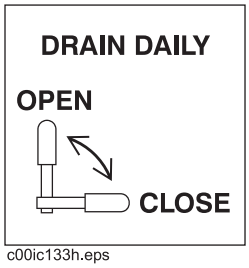
Item	Description	Notes
1. Inlet valve  c00ic127h.eps	To close valve (stop suction), rotate up. To open valve (start suction), rotate down.	

Item	Description	Notes
2. Water tank drain  c00ic604h.eps	To drain tank, open valve. Close valve when tank is empty.	
3. Water tank supply valve  c00ic603h.eps	To open valve (send water from the water tank through the pump and water lance), rotate counterclockwise. To close valve (stop water flow), rotate clockwise.	**IMPORTANT:** Water tank supply valve or antifreeze supply valve must be open when pump is running or pump will be damaged.
4. Vacuum gauge  c00ic131h.eps	Displays blower vacuum reading in inches of mercury. Vacuum relief valve opens when vacuum reaches 16" (406 mm).	
5. Antifreeze tank supply valve  c00ic603h.eps	To open valve (send antifreeze through pump and water lance), rotate counterclockwise. To close valve (stop antifreeze flow), rotate clockwise.	**IMPORTANT:** Water tank supply valve or antifreeze supply valve must be open when pump is running or pump will be damaged.

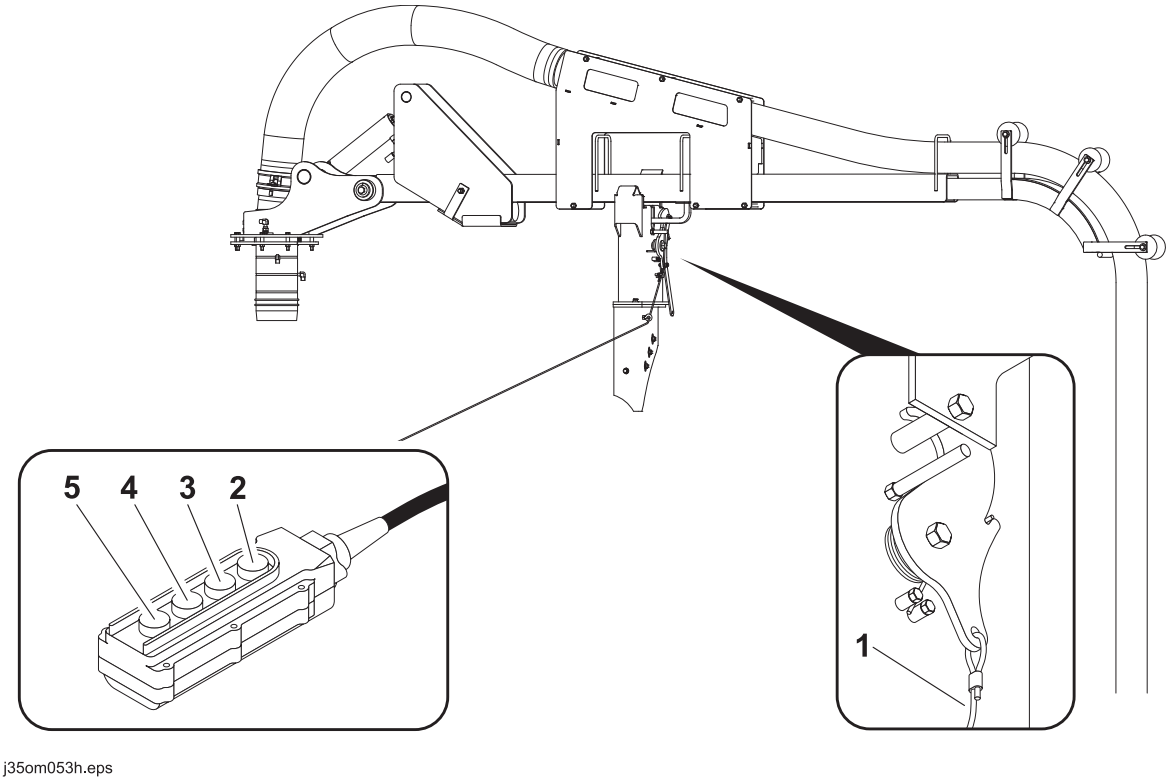
Item	Description	Notes
6. Flow direction control  c00ic605h.eps	To operate in reverse flow mode, turn counterclockwise. To operate in vacuum mode, turn clockwise.	Use reverse flow to unload tank contents to another tank. Operate in reverse flow mode only when drain/ outlet valve is open.
7. Drain/Outlet valve  c00ic127h.eps	To drain tank, rotate down. To close drain, rotate up.	
8. Reverse flow gauge  c00ic131h.eps	Displays reverse flow pressure.	

Item	Description	Notes
1. Inlet valve  c00ic127h.eps	To close valve (stop suction), rotate up. To open valve (start suction), rotate down.	***NOTICE:*** If hose or tool gets stuck on the ground or material being vacuumed, use tank inlet valve to break suction.

Item	Description	Notes
2. Vacuum hose reel control  c00ic128h.eps	To wind vacuum hose, push up. To unwind vacuum hose, pull down.	
3. Water tank supply valve  c00ic129h.eps	To open valve (send water from the water tank through the pump and water lance), rotate counterclockwise. To close valve (stop water flow), rotate clockwise.	
4. Antifreeze tank supply valve  c00ic130h.eps	To open valve (send antifreeze through pump and water lance), rotate counterclockwise. To close valve (stop antifreeze flow), rotate clockwise.	
5. Water tank drain  c00ic132h.eps	To drain tank, open valve. Close valve when tank is empty.	

Item	Description	Notes
6. Drain/Outlet valve  c00ic127h.eps	To drain tank, rotate down. To close drain, rotate up.	
7. Vacuum gauge  c00ic131h.eps	Displays blower vacuum reading in inches of mercury. Vacuum relief valve opens when vacuum reaches 16" (406 mm).	
8. Vacuum filter drain  c00ic133h.eps	To drain vacuum filter canister, rotate up. To close drain, rotate down.	

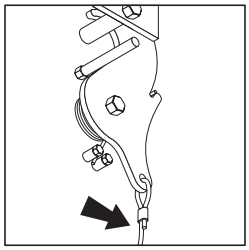
Vacuum Boom (optional)

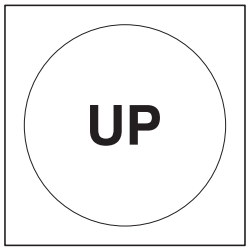
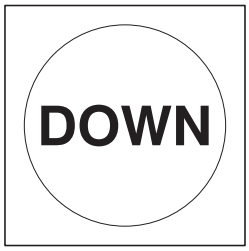
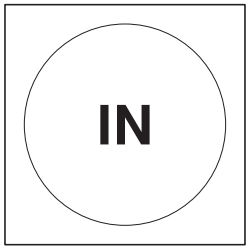
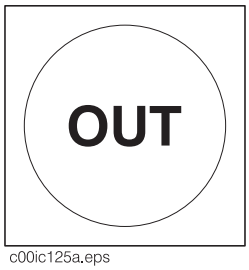


j35om053h.eps

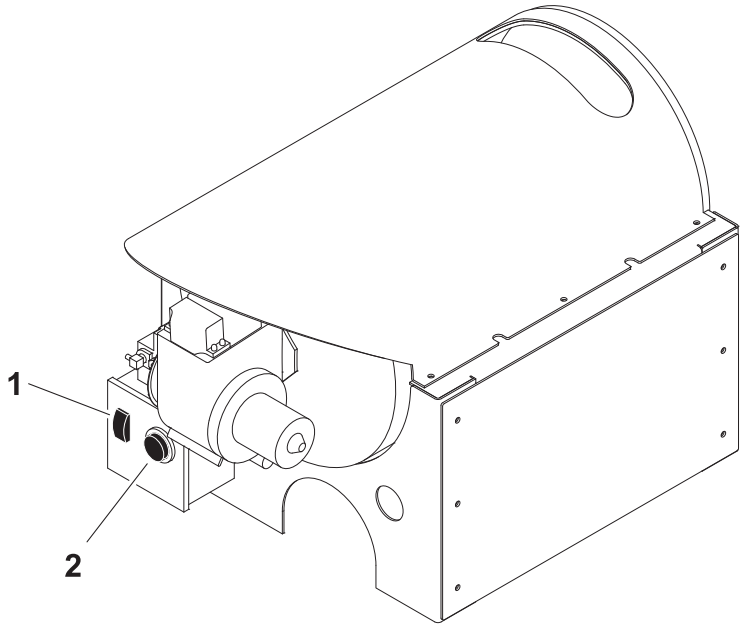
1. Boom latch
2. Boom up
3. Boom down
4. Boom retract
5. Boom extend

IMPORTANT: The vacuum boom can be controlled with the wireless control module or the tethered controller.

Item	Description	Notes
1. Boom latch  j23om010a.eps	Pull cable to open latch and release boom from saddle. Push boom into latch to lock boom into saddle.	

Item	Description	Notes
2. Boom up  c00ic122a.eps	To raise boom, press. To stop movement, release.	***NOTICE:*** • Do not use boom to raise or lower objects. • Do not use boom to break vacuum when hose is stuck to material being vacuumed. Use inlet valve.
3. Boom down  c00ic123a.eps	To lower boom, press. To stop movement, release.	***NOTICE:*** Do not use boom to raise or lower objects.
4. Boom retract  c00ic124a.eps	To retract boom, press. To stop movement, release.	
5. Boom extend  c00ic125a.eps	To extend boom, press. To stop movement, release.	

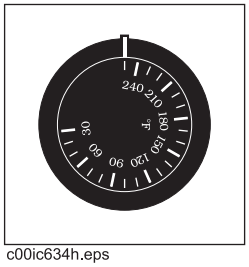
Water Heater (optional)



j33om085h.eps

1. Power switch
2. Temperature control *

* Temperature control not available on tandem-axle truck water heaters.

Item	Description	Notes
1. Power switch	To turn water heater on, press top. Red light will glow. To turn off, press bottom.	***NOTICE:*** Turn power switch off when unit is not in use. Turning off power pack engine does not turn off heater. **IMPORTANT:** Heater automatically shuts off when water level is too low.
2. Temperature control  c00ic634h.eps	Turn dial to set heater to desired temperature.	Not available on tandem-axle truck water heaters

Operation Overview

Chapter Contents

Planning

1. Gather information about jobsite (page 54).
2. Inspect jobsite (page 55).
3. Check supplies and prepare equipment (page 56).

Setting Up at Jobsite

FX50

1. Prepare jobsite (page 56).
2. Position vacuum excavation unit.
3. Leave unit hitched to towing vehicle or properly stabilized.
4. Block trailer wheels.

FXT50

1. Prepare jobsite (page 56).
2. Position vac truck.
3. Block truck wheels.

Vacuuming

1. Connect hoses (page 64).
2. Start unit (page 68).
3. Position optional vacuum boom (page 69).
4. Remove debris (page 71).
5. Disconnect hoses (page 84).
6. Drain tank (page 76) or unload to another tank (page 78).

Potholing

1. Connect hoses (page 64).
2. Start unit (page 68).
3. Pothole using water (page 72) or air (page 74).
4. Disconnect hoses (page 84).
5. Drain tank (page 76) or unload to another tank (page 78).

Operating Auxiliary Pneumatic Tools

IMPORTANT: Always operate auxiliary pneumatic tools at low air setting.

See air system and pneumatic tool operator's manuals.

Leaving Jobsite

1. Rinse unit and tools (page 83).
2. Stow tools (page 85).

Storing Equipment

1. For cold weather storage, antifreeze vacuum excavation unit (page 82).
2. For long-term storage, disconnect battery disconnect switch (page 38).

Prepare

Chapter Contents

Gather Information

A successful job begins before the excavation. The first step in planning is reviewing information already available about the job and jobsite.

Arrange for Traffic Control

If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

Prepare for Working Near Existing Utilities

If jobsite may contain electrical lines, wear protective boots and gloves meeting the following standards:

- Boots must have high tops and meet the electric hazard protection requirements of ASTM F2413 or ASTM F1117, when tested at 18,000 volts. Tuck legs of pants completely inside boots.
- Gloves must have 17,000 AC maximum use voltage, according to ASTM specification D120.

If working around higher voltage, use gloves and boots with appropriately higher ratings.

Plan for Emergency Services

Have the telephone numbers for local emergency and medical facilities on hand. Check that you will have access to a telephone.

Inspect Jobsite

- Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Inspect jobsite and perimeter for evidence of underground hazards, such as:
  - "Buried utility" notices
  - Utility facilities without overhead lines
  - Gas or water meters
  - Junction boxes
  - Drop boxes
  - Light poles
  - Manhole covers
  - Sunken ground
- Mark location of all buried utilities and obstructions.

Prepare Jobsite


WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050

To help avoid injury:

- Classify jobsite as electric if jobsite classification is in question or if the possibility of unmarked electric utilities exists.
- Expose lines by hand before digging.Cutting high voltage cable can cause electrocution.
- All vegetation near operator's station must be removed. Contact with trees, shrubs, or weeds during electrical strike could result in electrocution.

Prepare Excavation Point

- Clear the area to be excavated. Remove rocks or branches too large for vacuum hose.
- Select a solid area to stand on while excavating.

Check Supplies and Prepare Equipment

Assemble Accessories

Fire Extinguisher

If required, mount a fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

Lighting Kit

If you will need additional light, plug lighting kit into provided outlet. Contact your Ditch Witch® dealer for further information.

Check Supplies

- water and additional hoses
- fuel
- keys
- spray lubricant
- personal protective equipment, such as hard hat and safety glasses

Prepare Equipment

Fluid Levels

- fuel
- hydraulic fluid
- engine coolant
- battery charge
- engine oil
- blower oil

Condition and Function

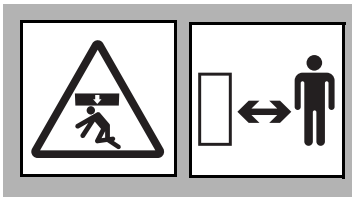
- filters (air, oil, hydraulic)
- belts
- hydraulic pump
- blower
- tires
- hoses and valves
- couplers and fittings
- water tanks

Transport

Chapter Contents

IMPORTANT: These transport instructions cover the FX50 trailer-mounted version only.

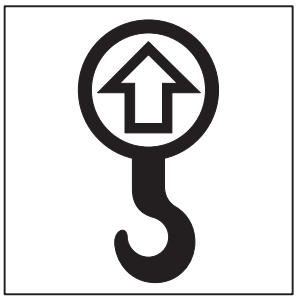
Lift



WARNING Crushing weight could cause death or serious injury. Stay away. 275-326

Points

Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.

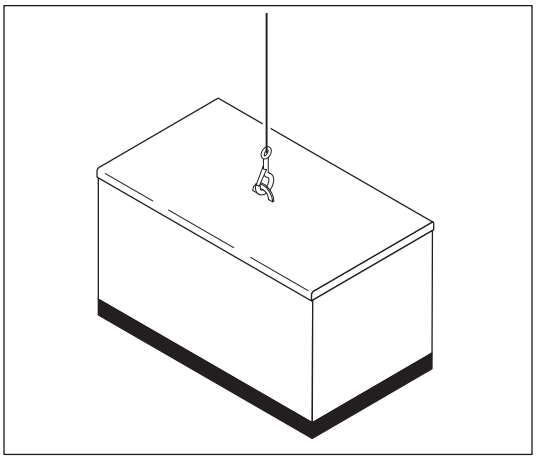


ic1319a.eps

Procedure

Power Pack

Use a crane capable of supporting 3000 lb (1360 kg). Use top lift point as shown.

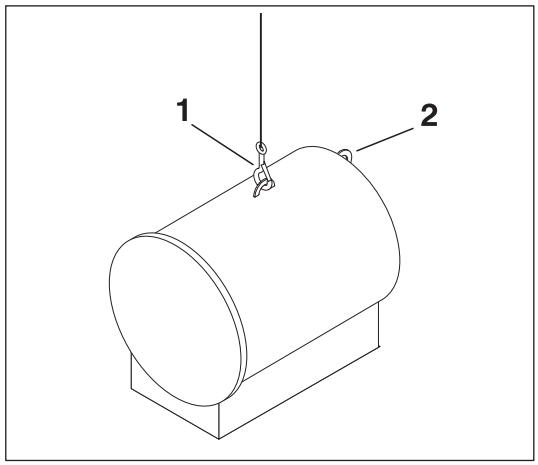


j08om002h.eps

Tank

Use crane capable of supporting the weight shown below. Use top lift point (1) as shown. Use end lift point (2) to drain tank if machine is disabled.

800 gallon	2500 lb (kg) kg
1200 gallon	3000 lb (1360 kg)



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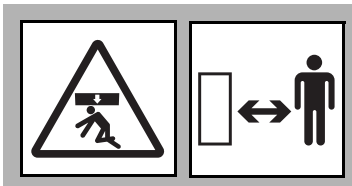
NOTICE:

- Relieve pressure in tank before storing or transporting.
- Only lift empty water or spoils tanks.
- Do not lift tank by vacuum boom, if installed.

Haul



WARNING Crushing weight could cause death or serious injury. Stay away. 275-326

To help avoid injury:

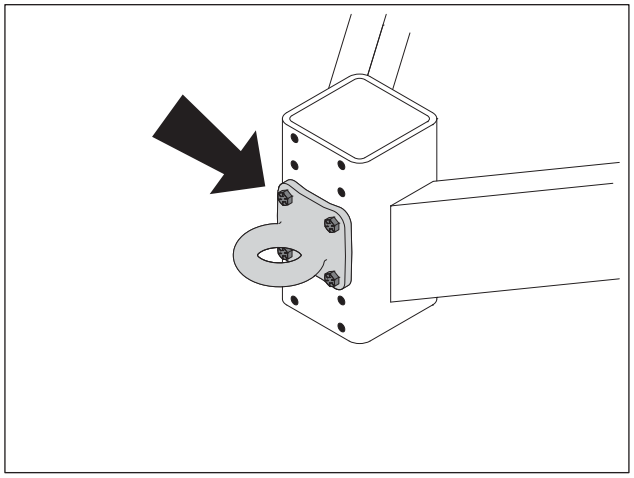
- Do not haul or move trailer unless tank is fully lowered and horizontal. Damage to machine or injury to personnel could occur.
- Do not haul or move trailer unless optional vacuum boom is secured by boom latch. Damage to machine or injury to personnel could occur.

Inspect Trailer

- Check hitch for wear and cracks. Lubricate if needed.
- Check battery for 12 volt charge.
- Inspect lights for cleanliness and correct operation. Inspect reflectors and replace if needed.
- Check tire pressure. Check lug nut torque with a torque wrench.
- Ensure trailer brakes are adjusted to come on in synchronization with tow vehicle brakes.
- Check ramps (if equipped) and trailer bed for cracks.

Hitch Trailer

1. Back tow vehicle to trailer.
2. Put manual transmission into first or reverse gear or automatic transmission into park. Turn off ignition. Set parking brake.
3. Connect trailer drawbar, lunette or coupler to tow vehicle hitch and lock in place with lock pin. If needed, adjust drawbar, lunette or coupler height (shown) to level load.
4. Connect safety chains to tow vehicle chain keepers (cross-shaped slots on bumper of tow vehicle). Attach left chain to right side of tow vehicle and vice versa to cradle hitch. Do not connect to pintle hook or hitch ball.
5. Connect breakaway switch cable to tow vehicle. Do not connect to pintle hook or hitch ball.
6. Plug trailer electrical connector into tow vehicle connector.
7. Use jack crank to raise jack base and stow.
8. Remove wheel blocks.



TrailerHitchAdjust_T18.eps

Unhitch Trailer

1. Stop tow vehicle and trailer on level ground.
2. Put manual transmission into first or reverse gear or automatic transmission into park. Turn off ignition. Set parking brake.
3. Block trailer wheels.
4. To unhitch trailer from tow vehicle, reverse "Hitch Trailer" steps.

Vacuum and Pothole

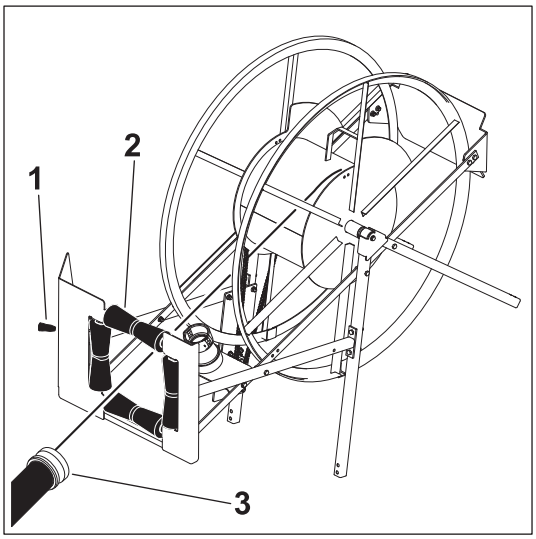
Chapter Contents

Connect Hoses

1. Remove vacuum hoses from storage.

   If using 1200:

   - Disconnect hose end from hose catch.
   - Insert hose through rollers (2).
   - Pull vacuum hose reel control (1) down to unwind hose.
   - Disconnect hose end (3) from hose reel.
2. Connect hoses. Secure all locking clamps.
3. Ensure drain/outlet valve is closed.



j08om005h.eps

Determine Tank Fill Level (FX50 Trailer Only)

Use these reference charts to help determine how full of various materials the vacuum tank can be without overloading trailer. **Exceeding the maximum fill level will overload the trailer**.

Never exceed the trailer capacity. You can exceed the vacuum tank lifting capacity. Drain the tank down to the lifting capacity before lifting tank.

To use these charts, first select the appropriate table based on trailer and vacuum tank size. Next find the material being excavated. If the material being excavated is not listed, find a material with similar density. Then, determine the maximum fill level based on the amount of water in the water tank.

IMPORTANT: For all materials, the vacuum tank should be no more than half full when lifting the tank.

300-gal Vacuum Tank on T9S Trailer

Material	**Maximum Vacuum Tank Fill Level**	
Water tank fill level	full (80 gal)	empty (0 gal)
wood chips (dry)	100%	100%
snow (dry)	100%	100%
water	76%	99%
light weight mud (8-10 lb/gal)	70%	92%
earth (dry, loose)	66%	86%
caliche	61%	79%
earth, loam	61%	79%
medium weight mud (10-12 lb/gal)	57%	75%
limestone (crushed)	49%	65%
asphalt	47%	62%
sand (dry)	47%	62%
earth (wet, excavated)	47%	62%
heavy weight mud (12-15 lb/gal)	47%	61%
gravel (dry)	46%	60%
shale, riprap	45%	59%
sand (wet)	36%	48%

800-gal Vacuum Tank on T18S Trailer

Material	**Maximum Vacuum Tank Fill Level**		
Water tank fill level	full (200 gal)	full (300 gal)	empty (0 gal)
wood chips (dry)	100%	100%	100%
snow (dry)	100%	100%	100%
water	100%	93%	100%
light weight mud (8-10 lb/gal)	96%	86%	100%
earth (dry, loose)	90%	81%	100%
caliche	83%	74%	100%
earth, loam	83%	74%	100%
medium weight mud (10-12 lb/gal)	79%	70%	95%
limestone (crushed)	68%	61%	82%
asphalt	65%	58%	79%
sand (dry)	65%	58%	78%
earth (wet, excavated)	65%	58%	78%
heavy weight mud (12-15 lb/gal)	64%	57%	78%
gravel (dry)	63%	56%	76%
shale, riprap	62%	55%	75%
sand (wet)	50%	45%	61%

1200-gal Vacuum Tank on BT26 Trailer

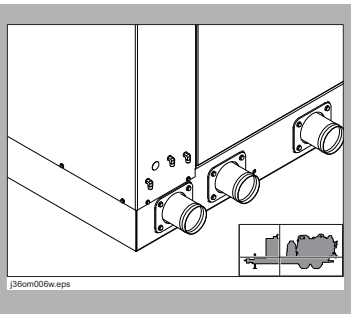
Material	**Maximum Vacuum Tank Fill Level**	
Water tank fill level	full (500 gal)	empty (0 gal)
wood chips (dry)	100%	100%
snow (dry)	100%	100%
water	94%	100%
light weight mud (8-10 lb/gal)	87%	100%
earth (dry, loose)	82%	100%
caliche	75%	100%
earth, loam	75%	100%
medium weight mud (10-12 lb/gal)	71%	99%
limestone (crushed)	61%	85%
asphalt	59%	81%
sand (dry)	59%	81%
earth (wet, excavated)	59%	81%
heavy weight mud (12-15 lb/gal)	58%	81%
gravel (dry)	57%	79%
shale, riprap	56%	78%
sand (wet)	48%	63%

Start Unit

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

Standard Procedure

IMPORTANT: If power pack is not connected to external tank control valves, connect a -04 hose with a minimum working pressure rating of 3000 psi (207 bar) from pressure (1) to power beyond (2) connections on power pack.



1. Open tank inlet valve.

NOTICE: Avoid idling engine with inlet valve closed.

2. If equipped with reverse flow, ensure vacuum is in "vacuum" mode before starting.
3. Insert key.
4. Turn key clockwise. See page 34 for more information.
5. Run engine at low throttle for 5 minutes.

Cold Start Procedure

WARNING Fire or explosion possible. Do not use starter fluid. 273-459 (2P), 274-206 (2P), 700-206 (2P)

1. Open tank inlet valve.

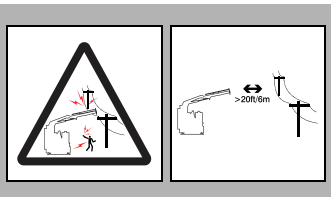
NOTICE: Avoid idling engine with inlet valve closed.

2. If equipped with reverse flow, ensure vacuum is in "vacuum" mode before starting.
3. Insert key.
4. Wait for cold start wait indicator to go out.
5. Turn key clockwise. See page 34 for more information.
6. Run engine at low throttle for 5 minutes.

Position Vacuum Boom

The vacuum boom is optional equipment. Contact your Ditch Witch® dealer to add this option.

Precautions Near Electrical Power Lines



DANGER Do not get boom near power lines. Death or serious injury will occur. Keep required distance between boom and power lines. Use a spotter. 270-1983

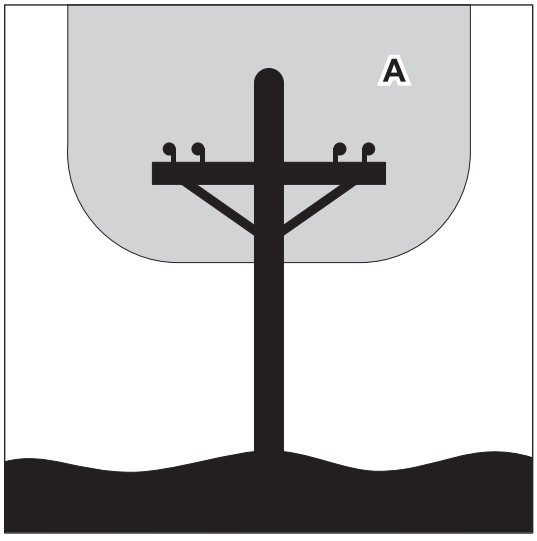
Never operate the boom within 10' (3 m) of electric power lines carrying up to 50 kV. Add 1' (305 mm) of clearance for each additional 30 kV or less (see table on left). Follow OSHA or other guidelines for working around power lines. Also observe minimum clearance requirements during transport (see table on right).

Normal voltage (phase to phase)	Minimum operating clearance required	
up to 50 kV	10'	3 m
51-200 kV	15'	4.6 m
201-350 kV	20'	6 m
351-500 kV	25'	7.6 m
501-750 kV	35'	10.7 m
751-1000 kV	45'	13.7 m

Normal voltage (phase to phase)	Minimum transporting clearance required	
up to 0.75 kV	4'	1.2 m
0.76-200 kV	6'	1.8 m
50-345 kV	10'	3.8 m
346-750 kV	16'	4.9 m
751-1000 kV	20'	6.1 m
unknown	20'	6.1 m

Do not enter the danger zone (A), unless one of the following conditions is met:

- An appointed person has confirmed that the electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work.
- Insulating barriers (not a part of the boom) have been erected to prevent physical contact with the lines.



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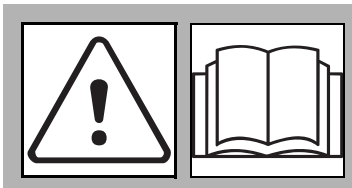
Procedure



WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

- Latch boom before tilting tank.
- Do not unlatch boom when tank is tilted up.
- If unit is parked on a slope, control boom so it does not swing freely when released.
- Do not use boom to lift or move objects. Using boom in an inappropriate way may damage equipment or injure personnel.
- Do not use boom to break vacuum.

See "Controls" on page 31 to become familiar with the power pack controls and the boom controllers.

1. Start engine.
2. Set hydraulic function switch to "boom" position.
3. Remove vacuum hoses from storage. If using a vacuum boom on a truck, attach provided extension hose to help maneuver the tool.
4. Pull boom latch cable to release boom.
5. Use boom controller to:
    - raise boom until it clears saddle.
    - extend/retract boom to desired length.
    - raise/lower boom to desired height.
6. Rotate boom by manually swinging it left or right.

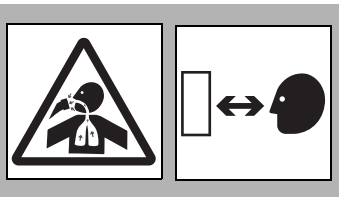
Remove Debris

EMERGENCY SHUTDOWN:

- Use inlet valve to shut off suction.
- Turn ignition switch to STOP.

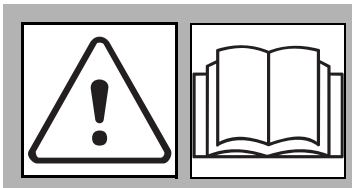
Procedure

1. Position vacuum hose in area to be excavated.
2. Start engine.



DANGER Vacuum can suffocate. Keep hose end away from face. 273-205

WARNING Fire or explosion possible. Do not vacuum flammable or combustible substances. 273-483



WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

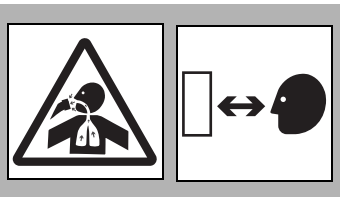
- Do not excavate hazardous or toxic materials. Unit is designed to excavate only soil cuttings, drilling fluids, and other non-toxic waste.
- Move tank inlet valve to break suction when hose or tool gets stuck on the ground or to what is being vacuumed.

3. Open inlet valve if necessary to begin excavation.
4. Use sight glasses to monitor debris level in tank. Vacuum will shut off when tank is full but always heed trailer and tank lifting capacities as indicated on page 64. Engine will remain running.

Pothole

EMERGENCY SHUTDOWN:

- Use inlet valve to shut off suction.
- Turn ignition switch to STOP.



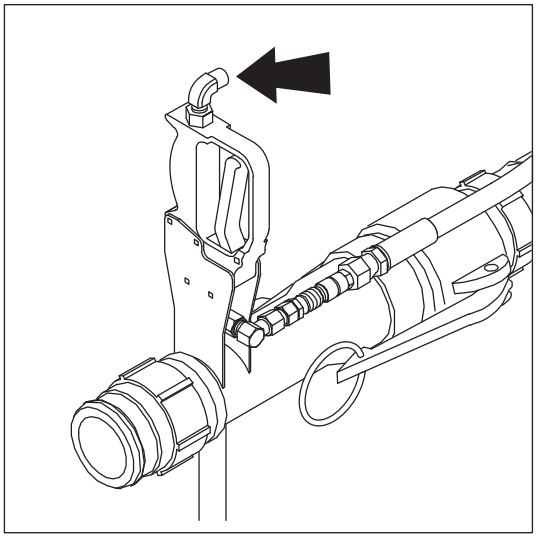
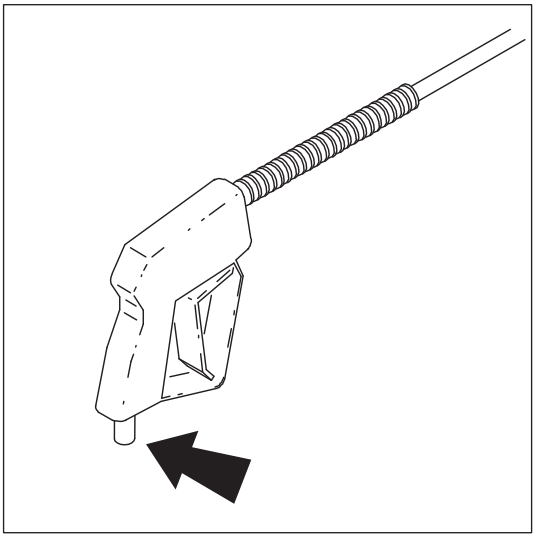
DANGER Vacuum can suffocate. Keep hose end away from face.
273-205

WARNING Fire or explosion possible. Do not vacuum flammable or combustible substances. 273-483

With Water

Set Up

1. Remove 2-in-1 potholing tool or basic potholing tool from storage.
2. Connect water pressure hose.

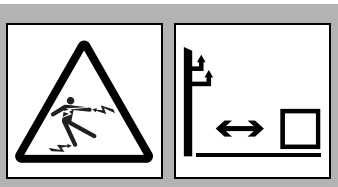
2-in-1 Tool	Basic Tool
 j08om006h.eps	 j08om007h.eps

Operate

1. Start engine.
2. Open water tank valve.

NOTICE: Avoid idling engine with inlet valve closed.

3. Move water pump switch to on.
4. Open inlet valve.
5. Position tool over area to be excavated and begin pothole.



DANGER Electric shock will cause death or serious injury. Stay away.

To help avoid injury: Do not direct water lance at overhead lines. Water conducts electricity.

2-in-1 Tool	Basic Tool
• Squeeze water pressure lever to start water pressure. • Work pressurized water in a rocking or circular motion to loosen and excavate soil until hole is at the desired diameter and depth.	• First use water lance to loosen soil. • Work tool in a rocking or circular motion to excavate soil. • Use water lance and tool alternately until hole is at the desired diameter and depth.

6. Adjust water pressure as needed to match soil conditions and/or material of utility being exposed.

WARNING Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035

To help avoid injury:

- Wear protective eyewear and clothing.
- Never use high flow when using wash wand.
- Never use fan nozzle to expose utilities.
- Never point or aim the wand at yourself or anyone else. Keep nozzle low to the ground but do not allow tip of lance to touch ground or utility.
- Keep wand moving over area to be potholed. Never point wand at utility continuously.
- Test water pressure on a sample of the utility line material to be exposed. Adjust pressure until no damage occurs to the material. High pressure water can cut utility lines.

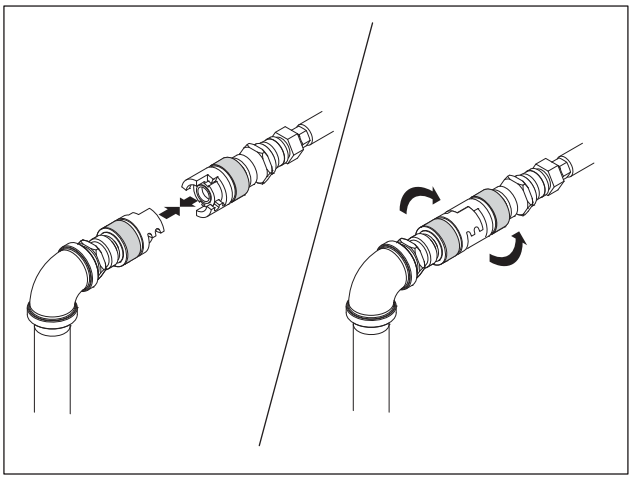
7. Ensure that water sprays from nozzle. If it does not, nozzle may be clogged and pump will not function properly. Clean or replace nozzle as necessary.
8. When freshwater tank is empty, stop operation and turn water pump switch to off.

NOTICE: Do **not** continue to operate with freshwater tank empty. Running water pump with no water will damage pump.

With Air

Set Up

1. Remove air lance from storage.
2. Connect air lance to air hose.
   - Align ends and move together.
   - Twist to engage latch.



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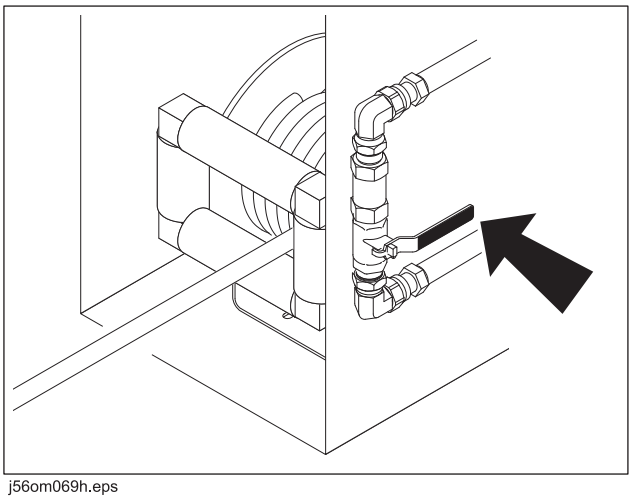
3. Slowly open service valve (shown).

IMPORTANT: Open service valve slowly to prevent velocity fuse from activating. If fuse activates, air pressure at the lance tip will be very low. Close service valve and slowly open it to remedy situation.



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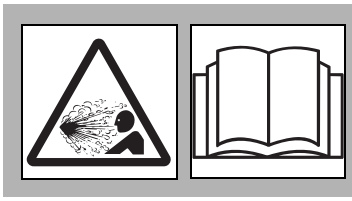
Operate

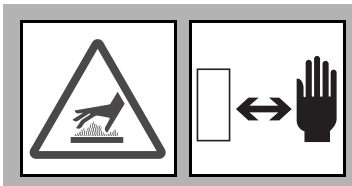
WARNING Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035

To help avoid injury:

- Wear protective eyewear, face shield and gloves when operating air lance.
- Never point or aim the wand at yourself or anyone else. Keep nozzle low to the ground but do not allow tip of lance to touch ground or utility.
- Check all connections and lines for leakage before using and check nozzle for damage.



WARNING Incorrect pressures may result in death or serious injury. Refer to air tool manual to ensure proper pressures are used. High pressure setting is for air lance only. 270-6891



CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P), 273-423 (2-P)

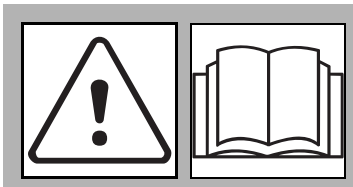
To help avoid injury: Remember that air generates heat. Connections could be hot during and after operation.

1. Locate utility with a locating receiver.
2. Set up air system. See air system operator's manual for information.
3. Connect hoses.
4. Start breaking the soil at the location of the utility. Do not touch the tip of the air lance to anything.
5. Once the hole has been started, vacuum loose soil and begin to work on exposing the sides of the utility next.
6. Vacuum loose soil as needed to expose utility.

Drain Tank

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

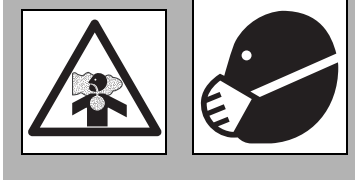
1. Ensure that unit is hitched to vehicle. See "Hitch Trailer" on page 62.
2. Haul unit to approved dumping area.



WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

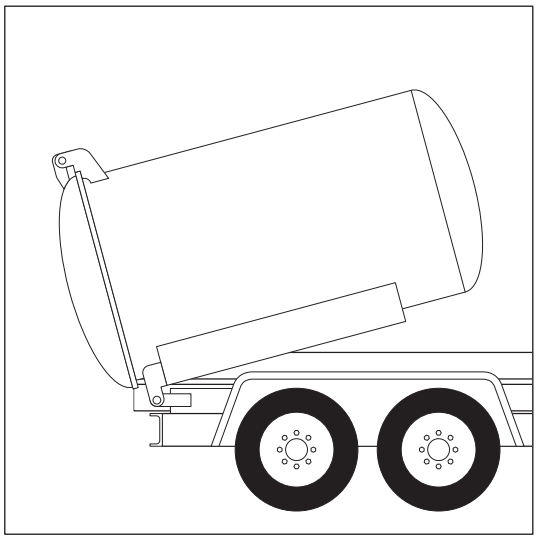
- Do **not** unhitch unit from tow vehicle before or during dumping. A freestanding unit can become unstable when tilting tank.
- Do not unlatch door with tank tilted up.
- Do not unlatch vacuum boom (optional) with tank tilted up.



CAUTION Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

NOTICE: Do not drive with tank or door raised.

3. Open drain/outlet valve and inlet valve.
4. Allow tank to drain in the horizontal position until tank is approximately half drained. Monitor sight glasses.
5. When tank is half drained, start engine and run at low idle.
6. Tilt tank up to help flush solids from tank.
7. Lower tank to the full horizontal position.
8. Close drain/outlet valve and inlet valve.
9. If further draining is necessary, open tank door. See "Open/Close Tank Door" on page 79.



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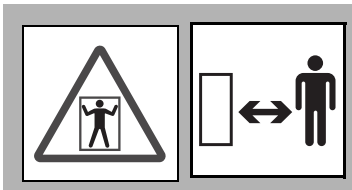
WARNING Crushing weight. Place cylinder lock on extended cylinder and secure. 273-231

10. Tilt tank up. Allow tank to drain completely.
11. Connect water pressure hose to water lance.
12. Turn water pump switch on. Adjust water pressure.
13. Use water lance to thoroughly rinse inside of tank and around door seal.

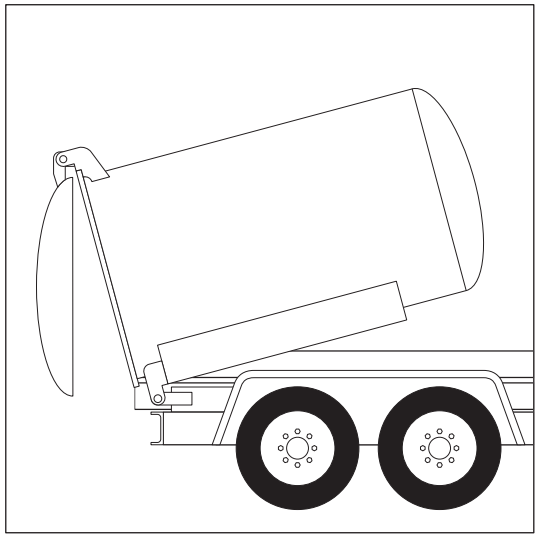


DANGER

273-200

Confined space will cause suffocation. Use proper procedures for entering or stay away.

To help avoid injury: Enter tank only if necessary. Follow U.S. Department of Labor guidelines for entering confined spaces.



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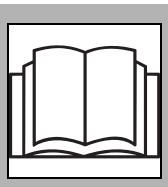
14. Return tank to the fully lowered horizontal position.
15. Close tank door. See "Open/Close Tank Door" on page 79.

Unload to Another Tank

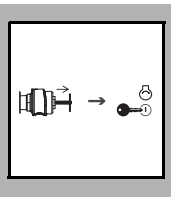
Optional reverse flow mode can be used to transfer vacuumed material to another tank or disposal site.

WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

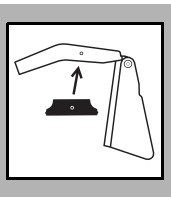
- Keep unit in "vacuum" mode unless pressure is needed.
- Restrain hose prior to pressurization. Unrestrained hose may cause property damage, injury or death.
- Do not open fitting cams or valves when tank is pressurized. Flying debris, plugs and doors can cause injury or death.
- Do not open tank door while tank is pressurized.
- Do not use pressure to clear clogs in vacuum hose.

WARNING System may be pressurized. If over pressurized, death or serious injury can occur. Exercise and clean relief before each use. 270-2736

1. Securely connect transfer hose to FX tank. Ensure drain/outlet valve on FX tank is closed.
2. Securely connect other end of transfer hose to offboard tank. Ensure inlet valve on offboard tank is closed and tank is vented.
3. Open FX tank drain/outlet valve. Material may flow into transfer hose.
4. Open offboard tank inlet valve. Move valve handle counterclockwise to engage "reverse flow" mode. Material will flow into offboard tank.
5. Increase throttle as desired to transfer material.
6. When transfer is complete, close FX tank drain/outlet valve.
7. Close offboard tank inlet valve and disconnect hose from offboard tank inlet valve.
8. Move handle clockwise to "vacuum" mode.
9. Open FX tank drain/outlet valve. Material will empty from transfer hose.
10. Close FX tank drain/outlet valve.
11. Disconnect transfer hose from FX tank.

Open/Close Tank Door

WARNING Crushing weight can cause death or serious injury. Pin door lock on linkage before servicing. 270-5216

To help avoid injury: Do not raise tank with door held closed only by vacuum. Door may suddenly open and possibly injure someone.

NOTICE: Do not drive with tank or door raised.

IMPORTANT: Depressurize tank before emptying cyclonic canister, cleaning filter, clearing hoses or opening any doors.

800 Tank:

Open

1. If tank is tilted, lower tank fully before opening door.
2. Open tank inlet valve.
3. Set hydraulic function switch to door position.
4. Press UP on tank controller.

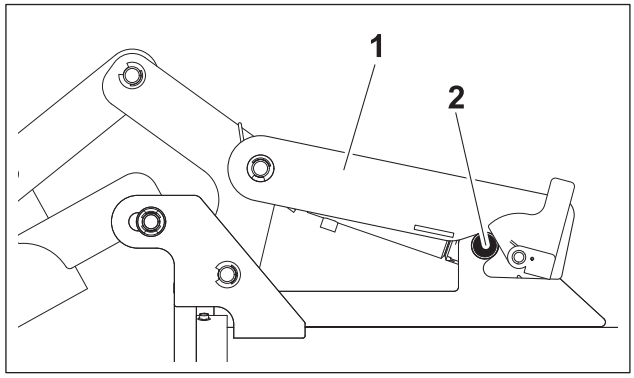
Close

1. Press DOWN on tank controller until the linkage on both sides of the tank is fully collapsed.
2. Close tank inlet valve.

1200 Tank:

Open

1. Push door seal control to SEAL.
2. Turn tank door lock counterclockwise.
3. Pull door seal control to RELEASE.
4. Turn door handle to DISENGAGE and pull out.
5. Push door lift control to OPEN.
6. Ensure door lift latch (1) engages properly. Door lift latch (1) must be fully seated on pin (2).



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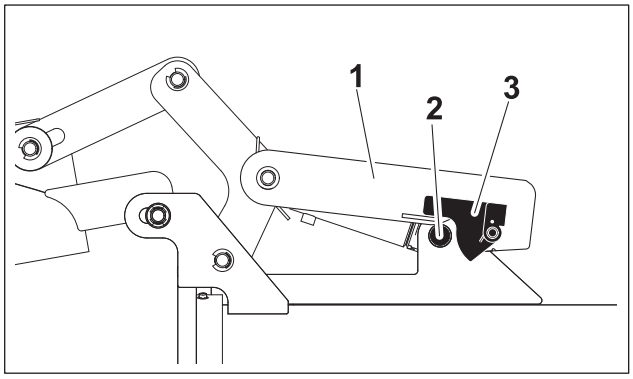
Close

1. Fully open door to disengage door lift latch (1) from pin (2). Latch cover (3) must be down for tank door to close.
2. Pull door lift control to CLOSE.
3. Turn door handle to DISENGAGE, push in and turn to ENGAGE.
4. Push door seal control to SEAL.
5. Turn tank door lock clockwise until it stops to lock.
6. Pull door seal control to RELEASE.



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Complete the Job

Chapter Contents

Antifreeze Fluid Excavation Unit

Add Antifreeze

Follow these steps for overnight or long-term storage of unit during cold weather.

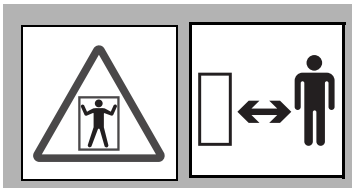
1. Fill antifreeze tank with a propylene-glycol based antifreeze.
2. Ensure that water tank valve is closed.
3. Open antifreeze tank valve.
4. Connect water pressure hose to water lance.
5. Start engine.
6. Move water pump switch to on.
7. Squeeze water lance handle and run until antifreeze runs through the water lance.
8. Move water pump switch to off.
9. Close antifreeze tank supply valve.
10. Turn ignition switch to off.
11. Drain water tank completely.

Reclaim Antifreeze

1. Turn water pressure down.
2. Move water pump switch to on.
3. Put end of water lance in antifreeze tank.
4. Squeeze water lance handle and run until water comes out of lance.
5. Move water pump switch to off.

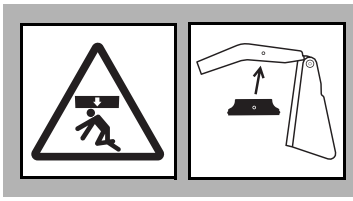
Rinse Equipment

Spray water onto equipment to remove dirt and mud. Use water lance. Thoroughly rinse inside of tank and around door seal.



DANGER Confined space will cause suffocation. Use proper procedures for entering or stay away. 273-200

To help avoid injury: Enter tank only if necessary. Follow U.S. Department of Labor guidelines for entering confined spaces.



WARNING Crushing weight can cause death or serious injury. Pin door lock on linkage before servicing. 270-5216

NOTICE: Do not spray water onto operator's console. Electrical components could be damaged. Wipe down instead.

Disconnect

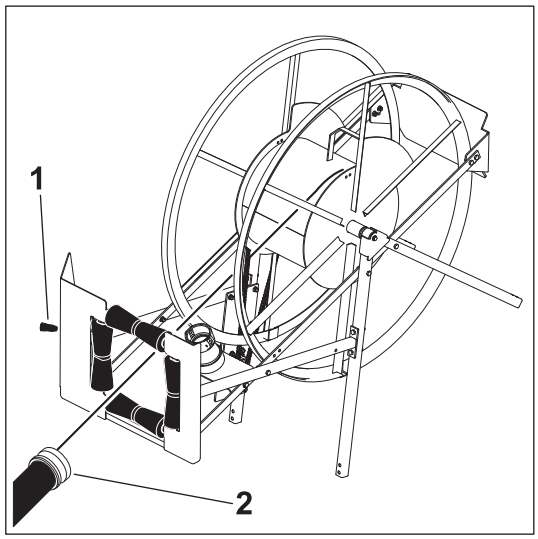
Disconnect and store the vacuum hoses, water pressure hose and air hose (if used).

Vacuum Hoses on 1200-gal unit:

1. Connect hose end (2) to hose reel.
2. Push vacuum hose reel control (1) up to wind hose.

> **IMPORTANT:** Ensure control returns to neutral when released. If it doesn't, have it repaired.

3. Connect hose end to hose catch.



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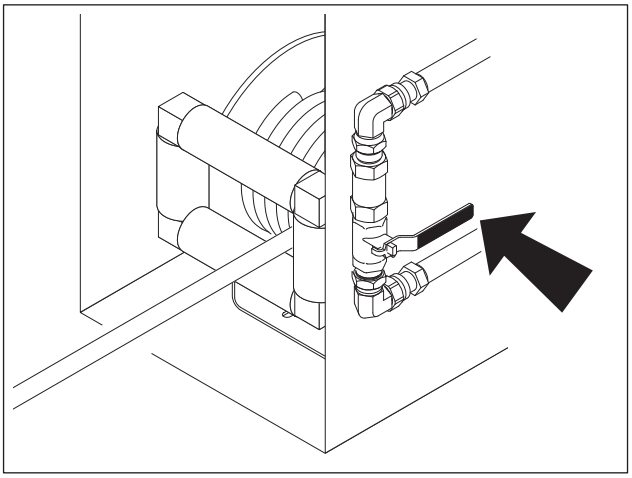
Air Hose:

1. Close service valve (shown).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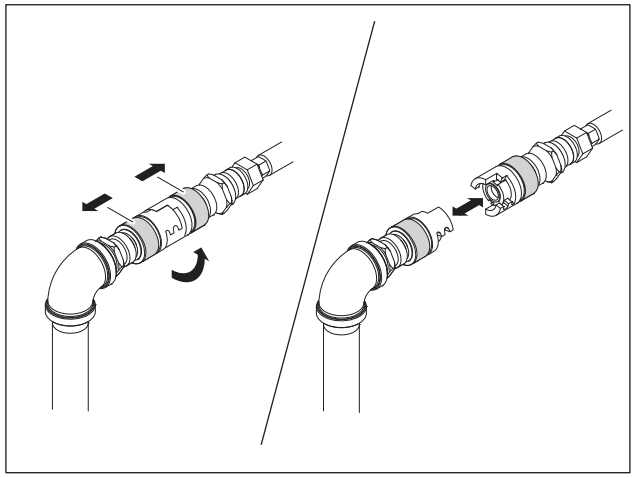
2. Disconnect air lance from air hose.
   - Pull back collar on air lance and on air hose.
   - Twist.
   - Pull ends away from each other.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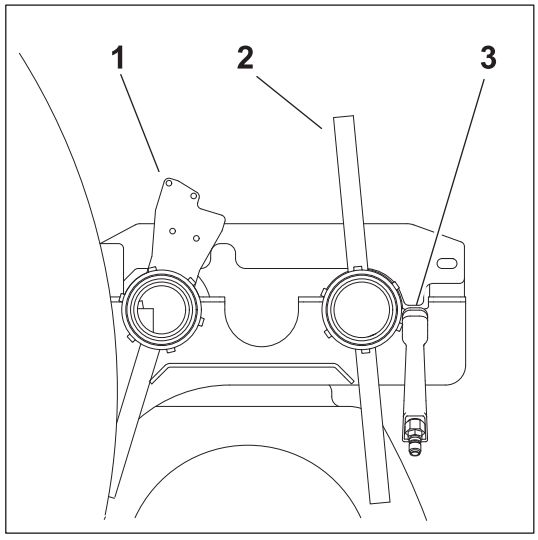
Stow Tools

Make sure optional vacuum boom, potholing tools, water lance, and other tools are properly stowed.

If using 1200, failure to stow tools as indicated could result in damage to water tank.

1. 2-in-1 potholing tool
2. Basic potholing tool
3. Water lance



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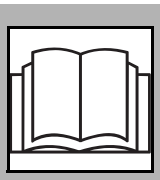
Service

Chapter Contents

Precautions



WARNING Read operator's manual. Know how to use all controls before operating machine. When you see this sign ⚠ on the machine or in the manual, read it and use caution. Your safety is at stake.

To help avoid injury:

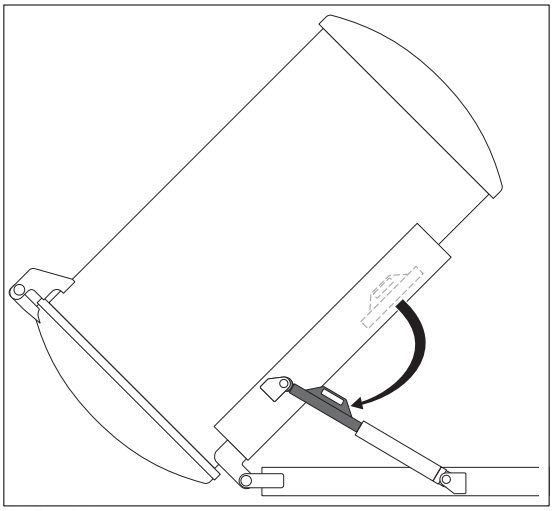
- Unless otherwise instructed, all service should be performed with engine off.
- Refer to engine manufacturer's manual for engine maintenance instructions.

Working Under Raised Debris Tank

WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Use tools (provided with unit) if hydraulic system must be serviced with tank tilted up.

1. Raise vacuum tank.
2. Remove cylinder lockout tool and place over extended cylinder rod.
3. Lower vacuum tank until load is supported by cylinder lockout tool.



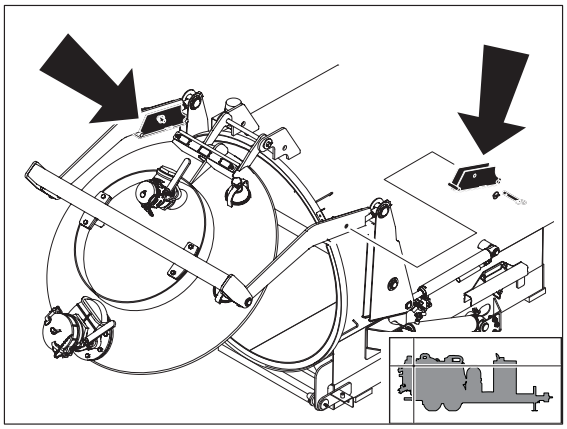
FX_Tank_Raised.eps

Working Under Raised Tank Door

WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Use tools (provided with unit) if unit must be serviced with tank door up.

1. Locate door lock tools in tool storage area and bring to rear of tank.
2. Raise tank door completely.
3. Pin door lock tools into place as shown.
4. Lower tank lid until load is supported by door lock tools.



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Welding Precaution

NOTICE: Welding can damage electronics.

- Disconnect battery to prevent damage to battery. Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.
- Connect welder ground clamp close to welding point and make sure no electronic components are in the ground path.
- Always disconnect the Engine Control Unit ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.

Washing Precaution

NOTICE: Water can damage electronics. When cleaning equipment, do not spray electrical components with water.

Recommended Lubricants/Service Key

Item	Description
DEO	Diesel engine oil meeting or exceeding CH-4 per the API service classification or E5 per the European Automobile Manufacturer's Association (ACEA) and SAE viscosity recommended by engine manufacturer (SAE 15W40)
HTG	NGLI #2 premium grade, petroleum-based grease with high temperature resistance and good mechanical stability
NDO	SAE30 non-detergent oil
SGL	Synthetic gear oil, ISO 100, p/n 256-044. See blower manual for more information.
MPL	Multipurpose gear oil meeting API service classification GL-5 (SAE 80W90)
THF	Tractor hydraulic fluid, similar to Phillips 66® PowerTran Fluid, Mobilfluid 423, Chevron Tractor Hydraulic Fluid, Texaco TDH Oil, or equivalent
MPG	Multipurpose grease meeting ASTM D217 and NLGI 5
DOT	DOT 3 or 4 brake fluid
	Check level of fluid or lubricant
	Check condition
	Filter
	Change, replace, adjust, service or test

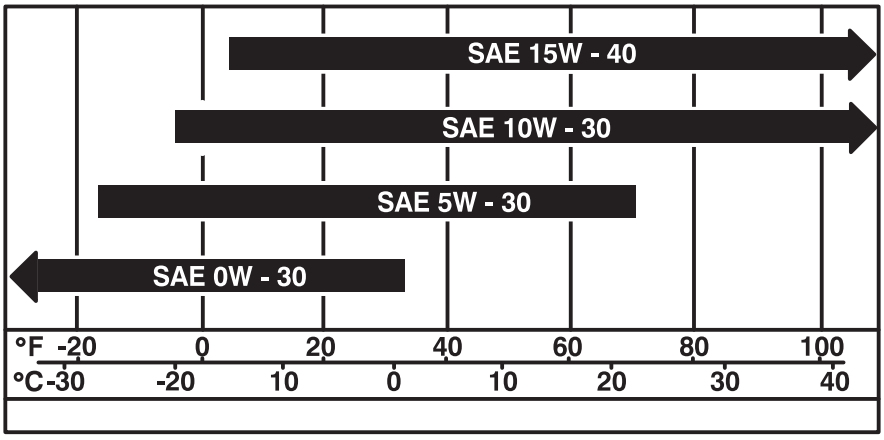
Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. Service intervals listed are for minimum requirements. Use only recommended lubricants. Fill to capacities listed in "Specifications" on page 129.

For more information on engine lubrication and maintenance, see your engine manual.

NOTICE:

- Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty.
- Use the "Service Record" on page 155 to record all required service to your machine.

Engine Oil Temperature Chart



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Temperature range anticipated before next oil change

See engine manual for more information about oil viscosity and operation in arctic conditions.

Approved Fuel

This engine is designed to run on diesel fuel. Use only high quality fuel meeting ASTM D975 No. 2D, EN590, or equivalent. At temperatures below 32° F (0° C) winter fuel blends are acceptable. See the engine operation manual for more information.

IMPORTANT: Fuel sulfur content should be less than 5000 ppm (0.5%). Worldwide, fuel sulfur regulations vary widely. Fuel used should always comply with local regulations. If using lube oil meeting API CJ-4, (or other low SAPS equivalent) and fuel with sulfur content above 15 ppm (0.0015%), ULSD in the U.S.), reduce oil change interval to 250 hours.

Biodiesel blends up to 5% (B5) are approved for use in this unit. The fuel used must meet the specifications for diesel fuel shown above. In certain markets, higher blends may be used if certain steps are taken. Extra attention is needed when using biodiesel, especially when operating in cold weather or storing fuel. Contact your Ditch Witch dealer or the engine manufacturer for more information.

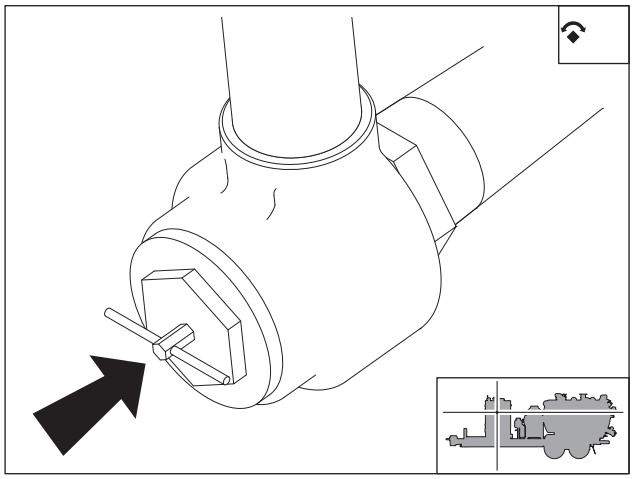
Each Use

Location	Task	Notes
Vacuum System	Exercise reverse flow relief valve	Optional
Trailer	Check torque of hitch bolts	
	Check hydraulic brake actuator bolts	If equipped
	Check hydraulic brake fluid level	If equipped; DOT 3 or 4
	Check trailer battery	
	Check tire pressure and lug nut torque	
	Check lights and reflectors	

Vacuum System

Exercise Reverse Flow Relief Valve

Exercise relief valve before each use. Pull valve handle (shown), twist it a few times and release. Also ensure vents on valve are free of mud and other restrictions.



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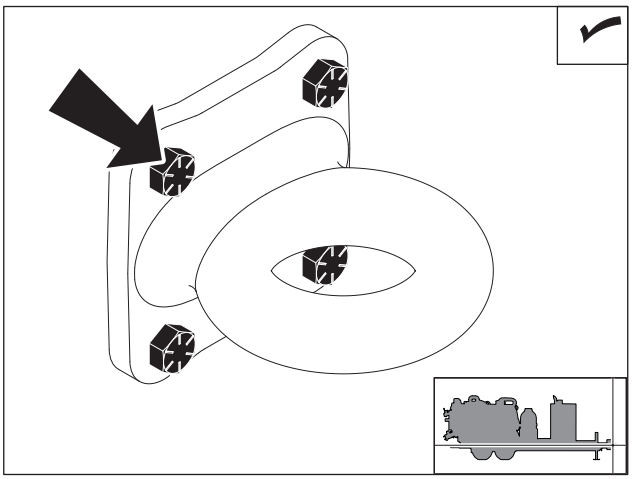
Trailer

Check Torque of Hitch Bolts

Check torque of hitch bolts. Torque varies by trailer model. Refer to "Specifications" on page 129.



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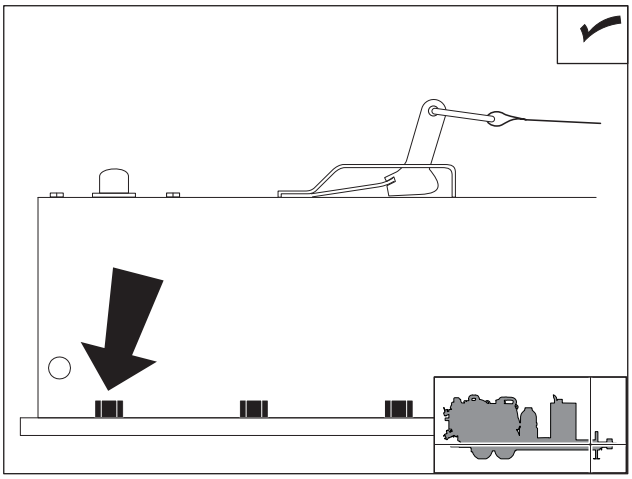
Check Hydraulic Brake Actuator Bolts

Check hydraulic brake actuator bolts. Tighten if loose.



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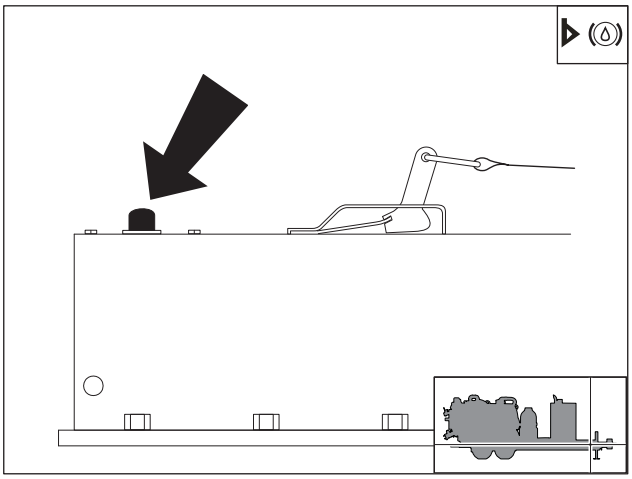
Check Hydraulic Brake Fluid Level

Check hydraulic brake fluid level at master cylinder each use. Fluid should be visible a top of master cylinder. Add DOT 3 or DOT 4 brake fluid and bleed brakes as needed. See page 122.



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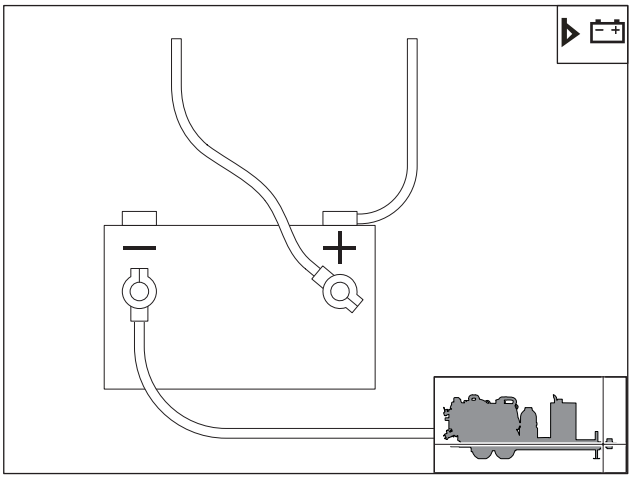
Check Trailer Battery

Check battery connections for wear or corrosion. Keep connections clean and tight. Batteries supplied by factory are maintenance-free. Service replacement batteries according to manufacturer's instructions.



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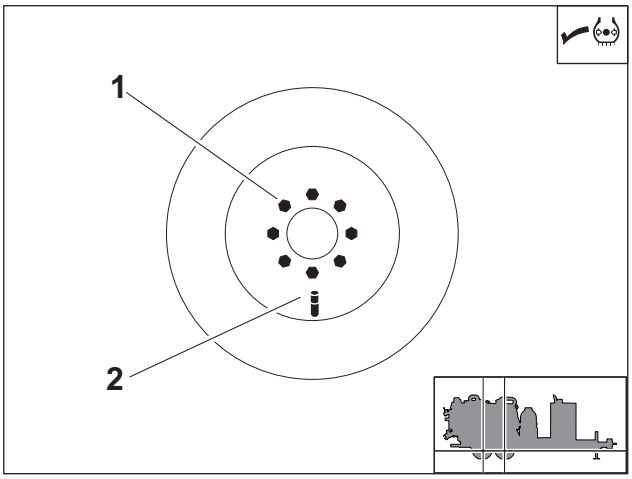
Check Tire Pressure and Lug Nut Torque

Check tire pressure (2) and lug nut (1) torque. See below for correct pressure and torque.

Trailer	Pressure	Torque
T9S	80 psi (5.5 bar)	90-120 ft•lb (122-163 N•m)
T18S	125 psi (8.6 bar)	275-325 ft•lb (372-441 N•m)
T26S	95 psi (7.6 bar)	190-210 ft•lb (258-285 N•m)



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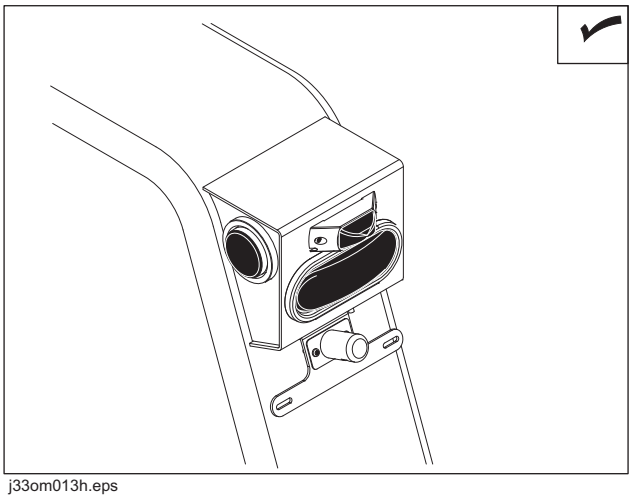
Check Lights and Reflectors

Check lights and reflectors for correct operation and cleanliness.



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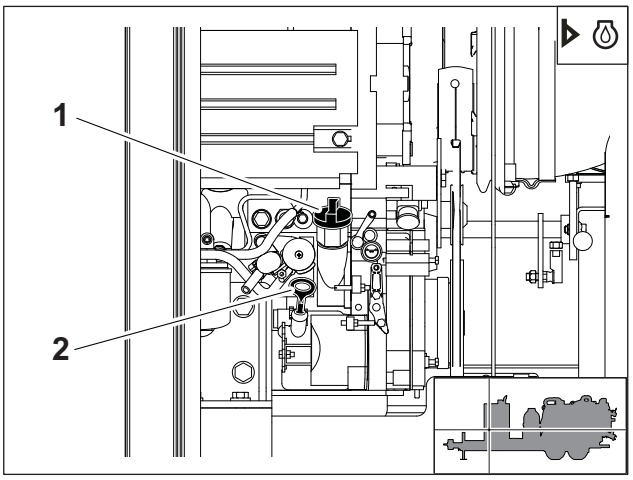
10 Hour

Location	Task	Notes
Vacuum System	Check engine oil level	
	Inspect belts (water pump, blower and fan)	
	Check air filter service indicator	
	Check hydraulic fluid level	THF
	Check hydraulic hoses	
	Check blower oil level	SGL
	Check blower	
	Check water pump oil level	NDO
	Check water pump	
	Check water pump regulator	
	Clean water pump filter	
	Clean vacuum air filter	
	Check spray nozzle	
	Drain cyclonic separator canister	if equipped
	Drain expansion canister	if equipped
Debris Tank	Check vacuum tank hoses	
	Check strobe light	
	Check vacuum tank door seals/fittings	
	Check tank deflector	

Vacuum System

Check Engine Oil Level

Check engine oil at dipstick (2) before operation and every 10 hours thereafter. Check with unit on level surface and at least 15 minutes after stopping engine. Add DEO at fill (1) as necessary to keep oil level at highest line on dipstick.



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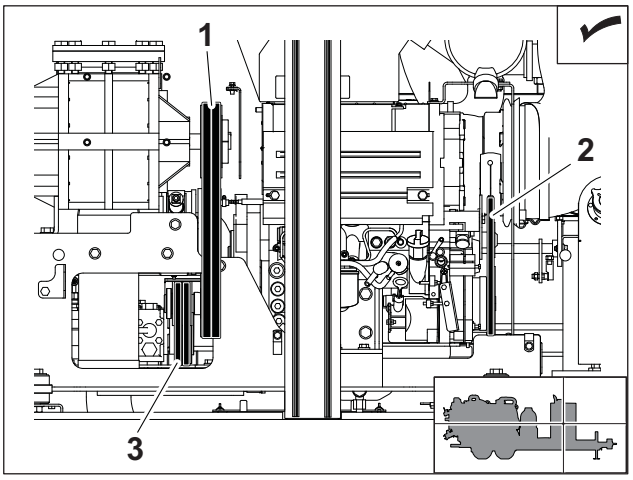
Inspect Belts

Check fan (2), blower (1), and water pump (3) belts every 10 hours for damage or wear.



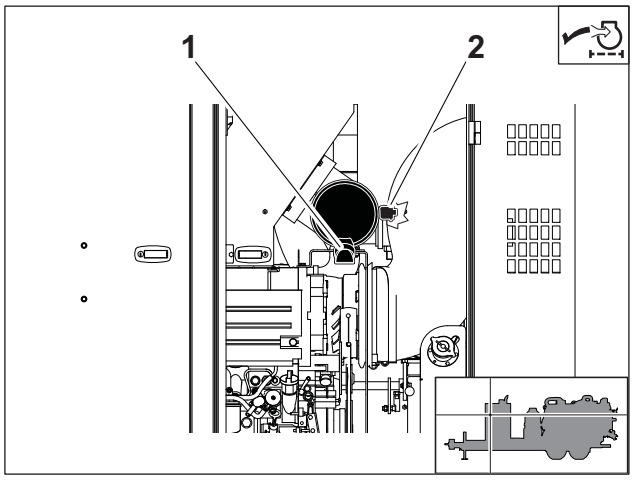
j36om058w.eps

Check Air Filter Indicator and Clean Dust Trap

Check air filter indicator (2) and inspect dust trap (1) for cracks every 10 hours. Change filter elements when indicator reaches red zone.

NOTICE: Only open the air filter canister when air restriction is indicated. Change the elements, do not attempt to clean them.

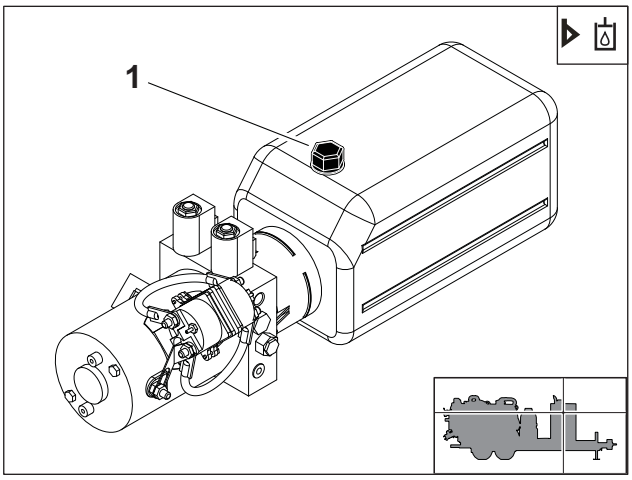
- Compressed air or water may damage filter elements.
- Tapping filter elements to loosen dirt may damage filter seals.



j36om007w.eps

Check Hydraulic Fluid Level

With frame level, check oil at indicator every 10 hours. Add THF at fill (1) as necessary. Clean dust from cap by blowing with low-pressure air.



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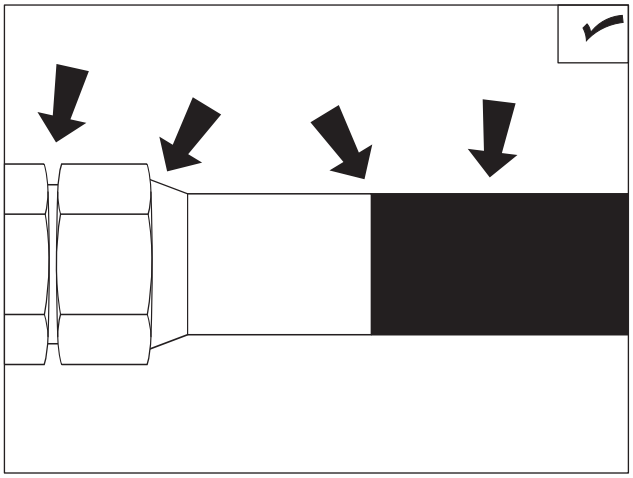
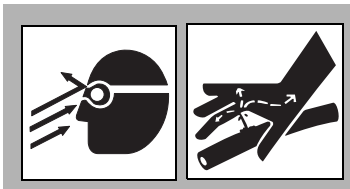
Check Hydraulic Hoses

Check hoses every 10 hours for wear or damage. Replace as needed.



CheckHoses.eps



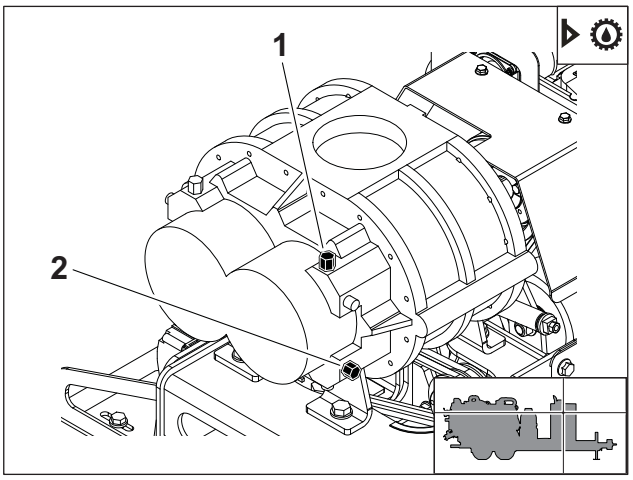
WARNING Fluid or air pressure could pierce skin and cause injury or death. Stay away.

To help avoid injury:

- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure. Lower, block, or support any raised component with a hoist. Cover connection with heavy cloth and loosen connector nut slightly to relieve residual pressure. Catch all fluid in a container.
- Before using system, check that all connections are tight and all lines are undamaged.
- Fluid leaks can be hard to detect. Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

Check Blower Oil Level

With frame level, check blower oil at sight glass (2) every 10 hours. Add SGL at breather (1) as necessary to maintain oil level at halfway point on sight glass (2). Do not overfill.



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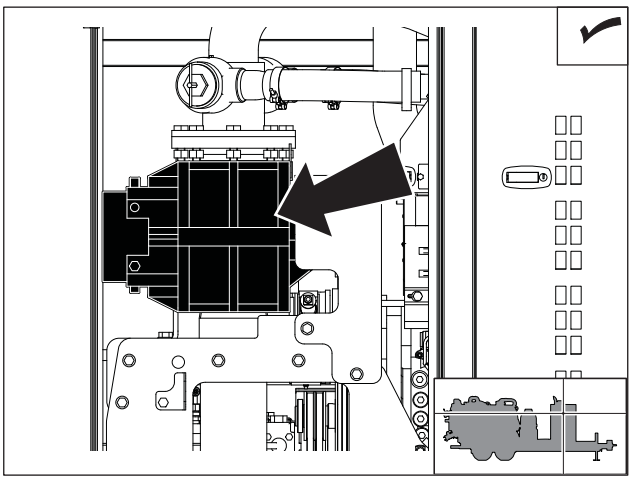
Check Blower

Check blower every 10 hours for unusual noise or vibration. If malfunction is detected:

1. Stop engine.
2. Consult blower repair manual.



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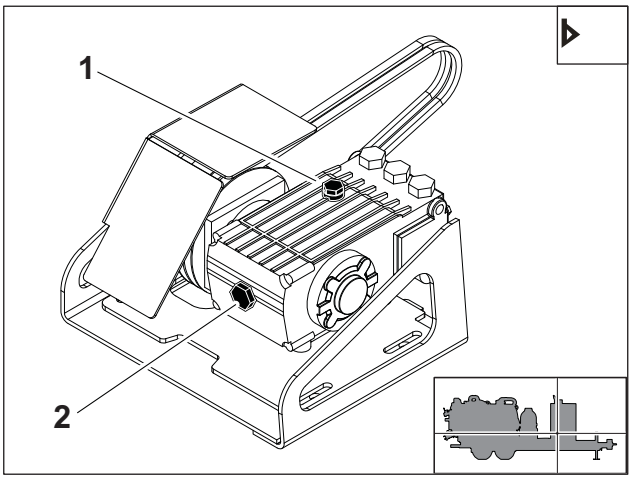
Check Water Pump Oil Level

With frame level, check water pump oil at dipstick every 10 hours. Oil level should be at middle of sight glass (2). Add NDO at fill (1) as necessary to keep oil at full mark on dipstick.



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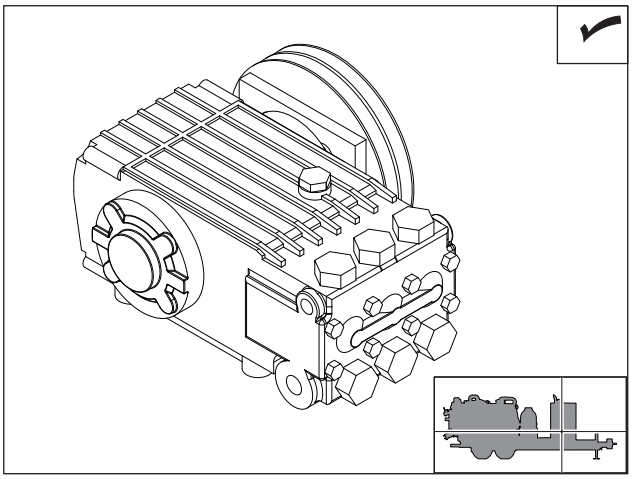
Check Water Pump

Check water pump unit every 10 hours for leaks, loose fittings, unusual noise or vibration. Repair if necessary.



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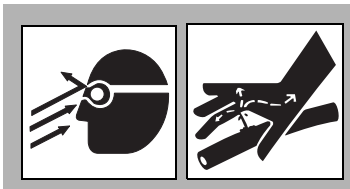


WARNING Fluid or air pressure could pierce skin and cause injury or death. Stay away.

To help avoid injury:

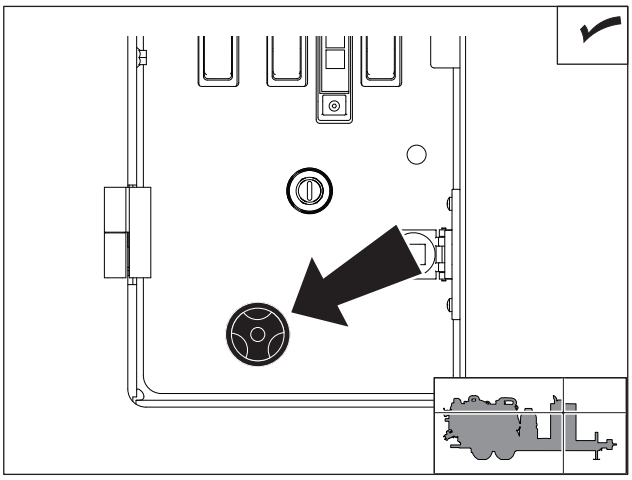
- Before using system, check that all connections are tight and all lines are undamaged.
- Use a piece of cardboard or wood, rather than hands, to search for leaks. Fluid leaks can be hard to detect.
- Wear protective clothing, including gloves and eye protection.

Check Water Pump Regulator

Check for proper operation of regulator every 10 hours.

To check:

1. Start engine.
2. Connect water pressure hose to water lance.
3. Move water pressure switch to on.
4. Squeeze water lance handle. Water pump should engage.
5. Release water lance handle. Water pump should disengage.

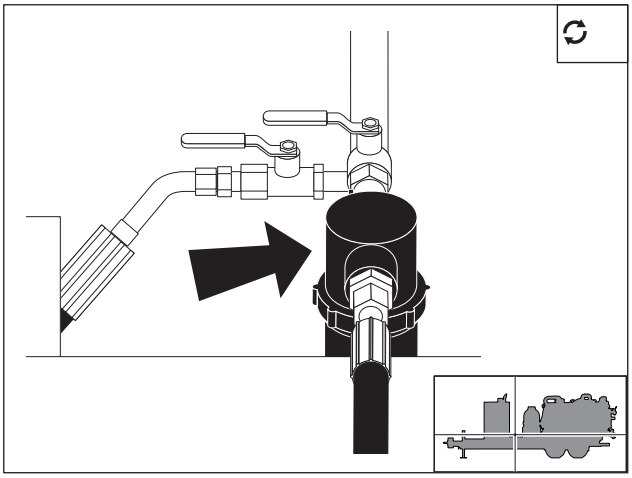

j36om062w.eps

If pump does not engage and disengage with movement of water lance handle, water pump control system is not functioning properly. See water pump manual for more information.

Clean Water Pump Filter

Clean water pump filter every 10 hours and replace as needed.

1. Open filter housing.
2. Remove element and rinse housing thoroughly with water.
3. Inspect element for signs of collapse and for brittle or broken rubber seals on the ends of the element. Replace as needed. See page 118.
4. Replace element and close filter housing.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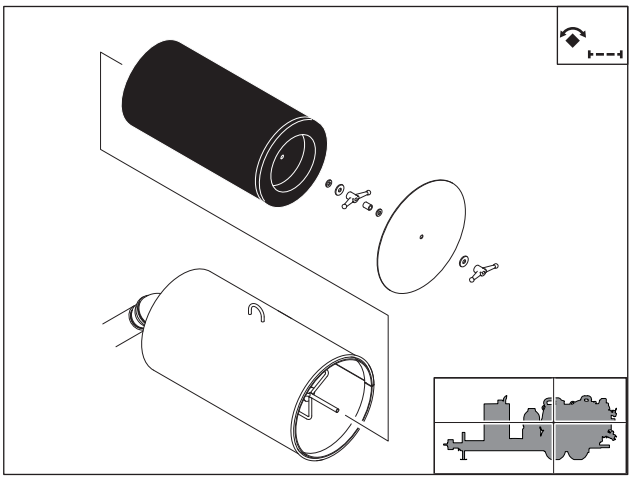
Clean Vacuum Air Filter


j36om027w.eps

Clean filter every 10 hours or as needed.

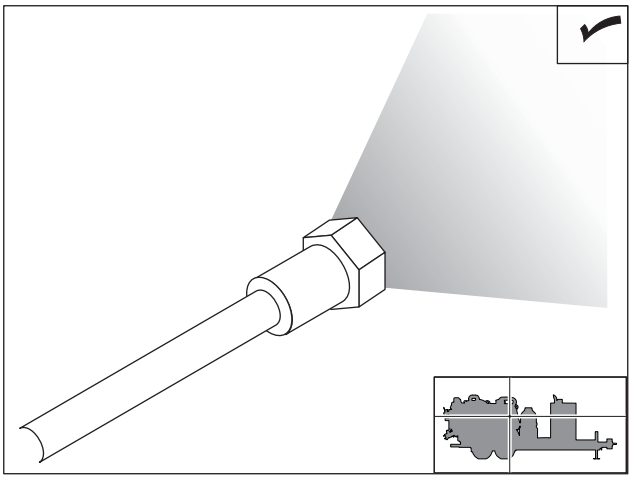
To clean filter:

1. Remove filter from canister.
2. Run low pressure water into inside of filter.

> ***NOTICE:*** Do not use high pressure water to clean filter. Filter will be damaged.

3. Allow filter to dry completely before returning to canister.

Check Spray Nozzle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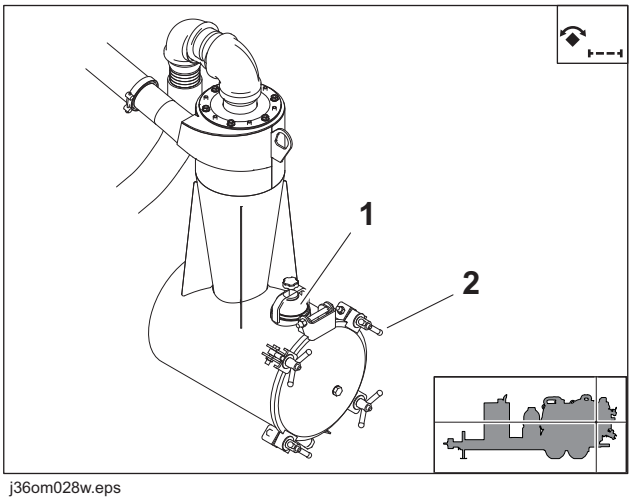
Check spray nozzle every 10 hours. Ensure that water sprays from nozzle in a fan pattern. Clean or replace nozzle as necessary.

Drain Cyclonic Separator Canister



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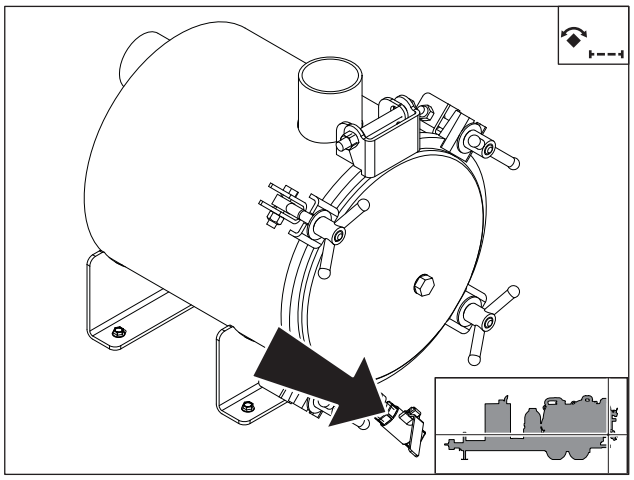
> **IMPORTANT:** Depressurize tank before emptying cyclonic canister, cleaning filter, clearing hoses or opening any doors.

Drain canister at drain (2) every 10 hours or when water is visible in sight glass (1).

Drain Expansion Canister

IMPORTANT: Depressurize tank before emptying expansion canister, cleaning filter, clearing hoses or opening any doors.

Drain canister at drain (shown) every 10 hours.



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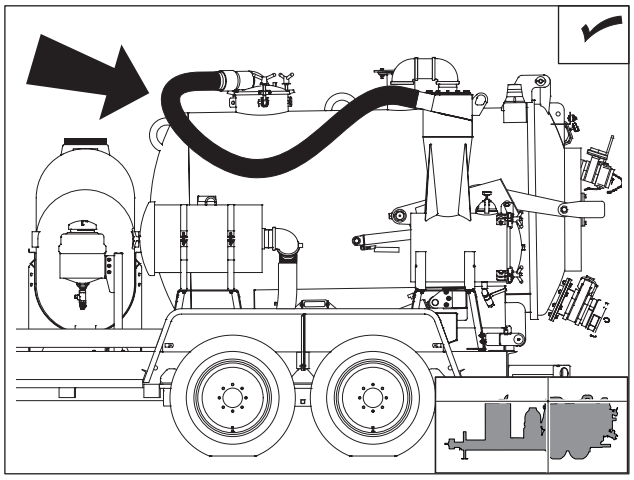
Debris Tank

Check Vacuum Tank Hoses

Check hoses every 10 hours for wear or damage. Replace as needed.



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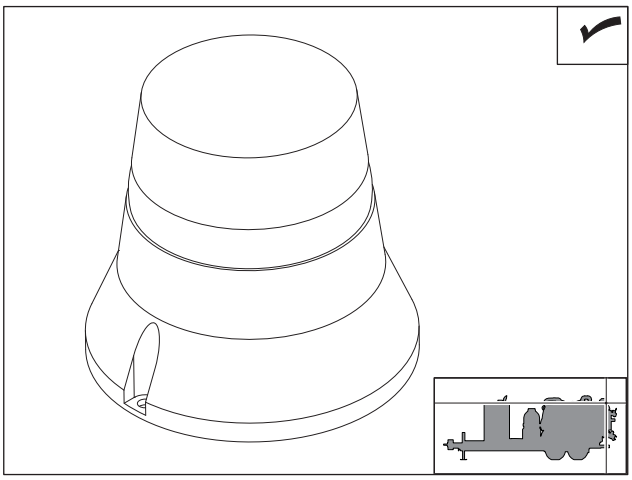
Check Strobe Light

Check strobe light for proper function every 10 hours. When ignition is on, strobe light should be flashing. Repair if necessary.



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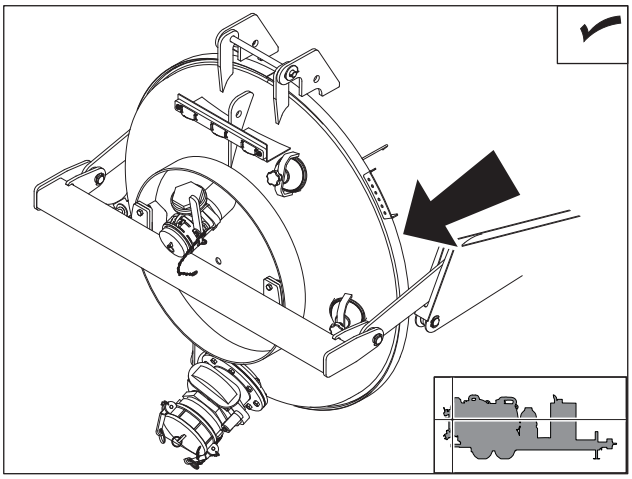
Check Vacuum Tank Door Seals and Fittings

Check door seal every 10 hours for wear or damage. Repair if necessary. Check for leaks and loose fittings every 10 hours. Repair or replace if necessary.



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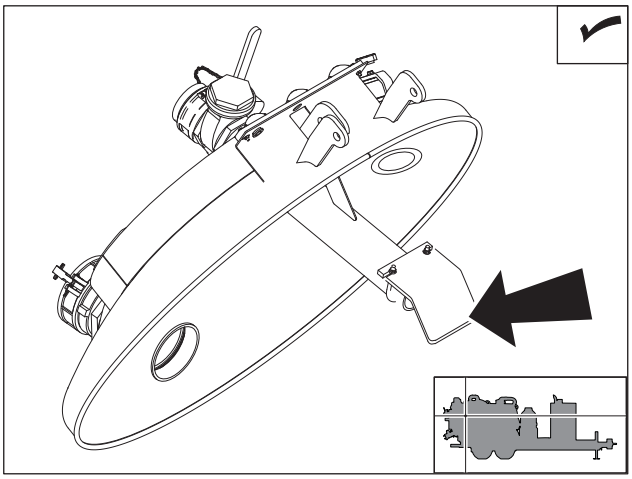
Check Tank Deflector

Check tank deflector every 10 hours for buildup, wear, or damage. Clean or replace as needed.



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25 Hour

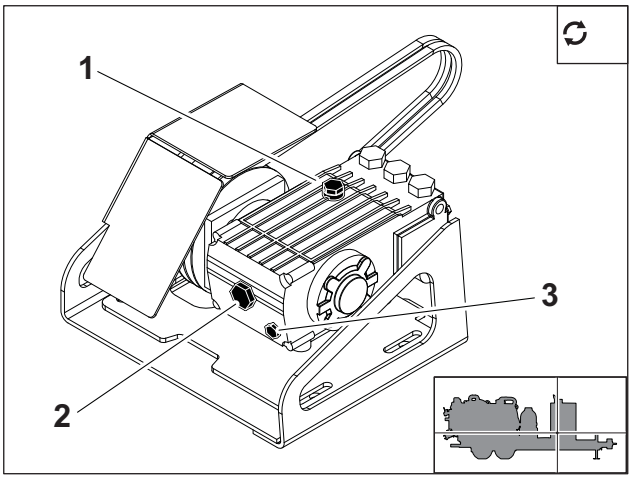
Location	Task	Notes
Vacuum System	Change water pump oil	Initial service, NDO

Vacuum System

Change Water Pump Oil

Change oil after the first 25 hours of operation and every 100 hours thereafter. Change oil more frequently if working in dusty conditions.

- Drain at drain plug (3) while oil is warm.
- Add NDO at fill (1) until oil is at halfway mark on sight glass (2).



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50 Hour

Location	Task	Notes
Vacuum System	Check water pump belt tension	
	Check fan belt tension	
	Check blower belt tension	
	Inspect cooling fan	
	Check blower relief valve	
	Check water pressure hoses	
Debris Tank	Lube tank pivot pins	
Vacuum Boom	Lube boom pivot	Boom is optional equipment

Vacuum System

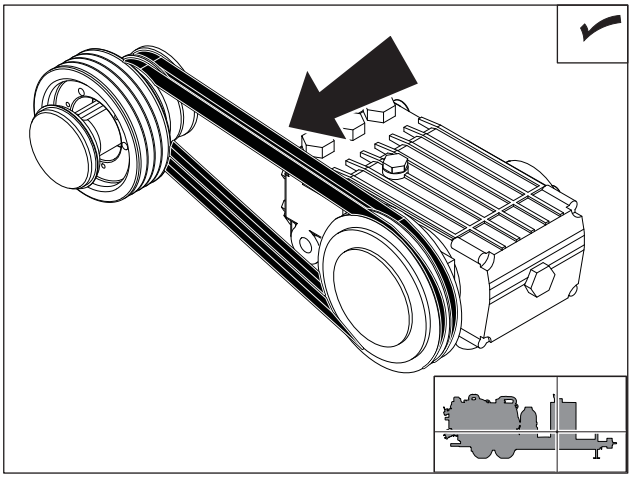
Check Water Pump Belt Tension

Check belt every 10 hours for correct tension, damage or wear. Replace worn belt. Tighten as needed. See "Adjust Water Pump Belt Tension" on page 118.

To check

1. Turn ignition to STOP and remove key.
2. Apply moderate thumb pressure to belt between pulleys.

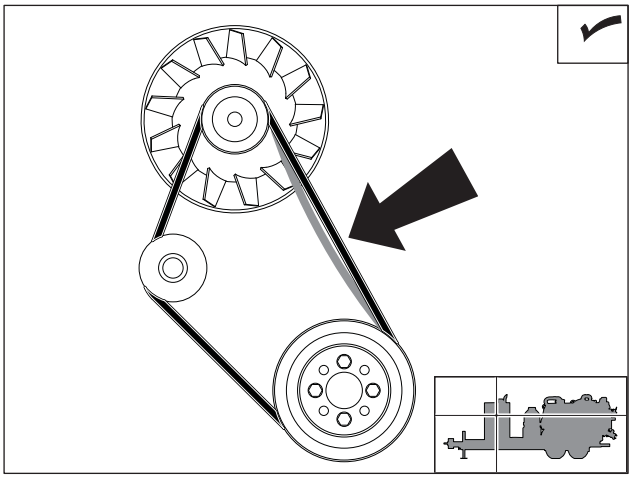
   Belt is properly tensioned when deflection is about .2-.3" (5-8 mm).



j36om014w.eps

Check Fan Belt Tension

Check fan belt tension every 50 hours. Belt is properly tensioned when it moves about 3/8" (10 mm) when pushed at the long span (shown). Adjust as needed. See "Adjust Fan Belt Tension" on page 117.



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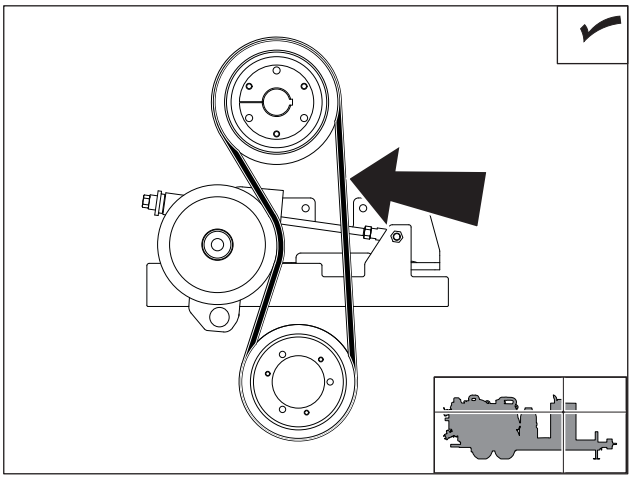
Check Blower Belt Tension

Check belt every 10 hours for correct tension, damage or wear. Replace worn belt. Both ends of tube must touch spring caps for belt to be correctly tensioned. Tighten as needed. See "Adjust Blower Belt Tension" on page 118.



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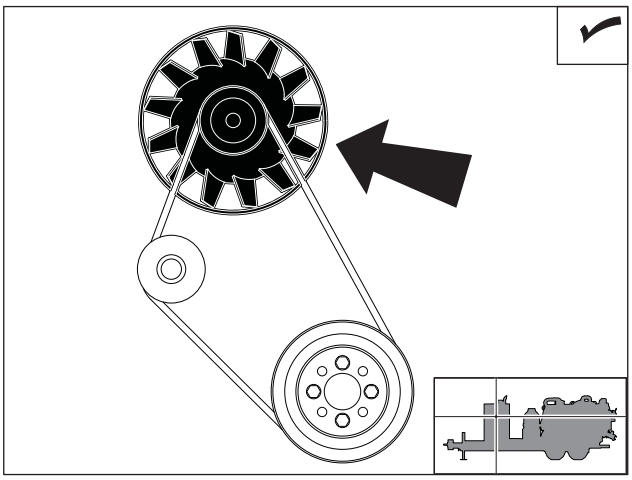
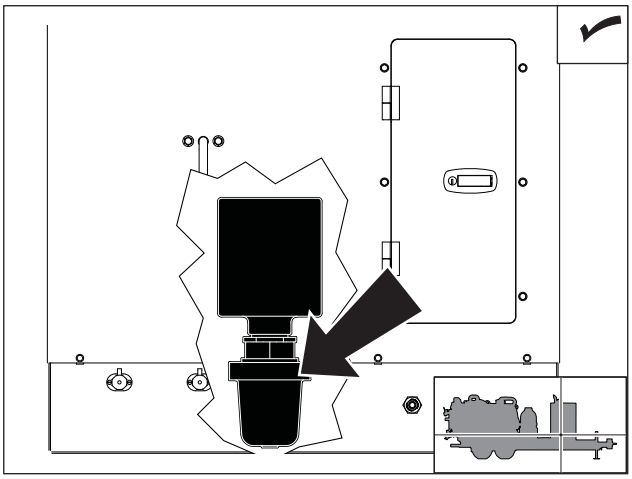
Inspect Cooling Fan

Check for cracks, loose rivets, and bent or loose blades. Check mounting screws and tighten if needed.



j36om060w.eps

Check Blower Relief Valve


j36om068w.eps

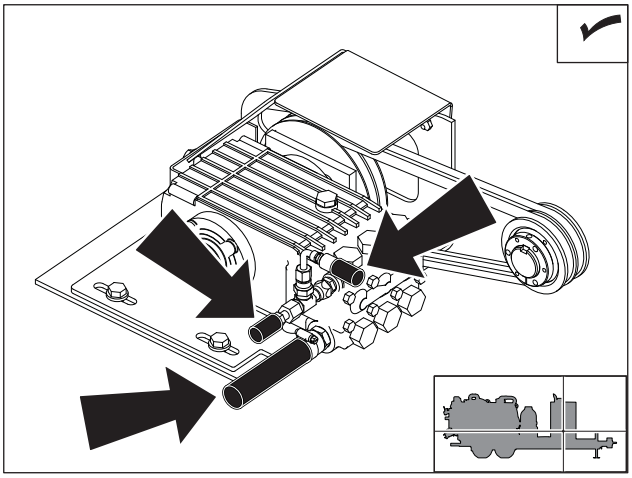
Check relief valve for proper operation every 50 hours.

To check:

1. Ensure that vacuum inlet valve and drain valve are both closed.
2. Start engine. Vacuum will start to build.
3. When vacuum goes over relief, check for suction at the bottom of the relief air filter.

   If suction is not present, stop engine and check relief valve.

Check Water Pressure Hoses

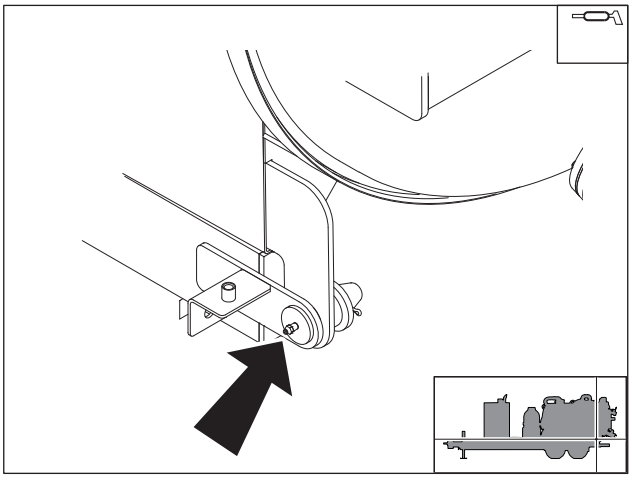

j36om030w.eps

Check hoses every 50 hours for wear or damage. Replace as needed.

Debris Tank

Lube Tank Pivot Pins

Lube two pins every 50 hours with MPG.

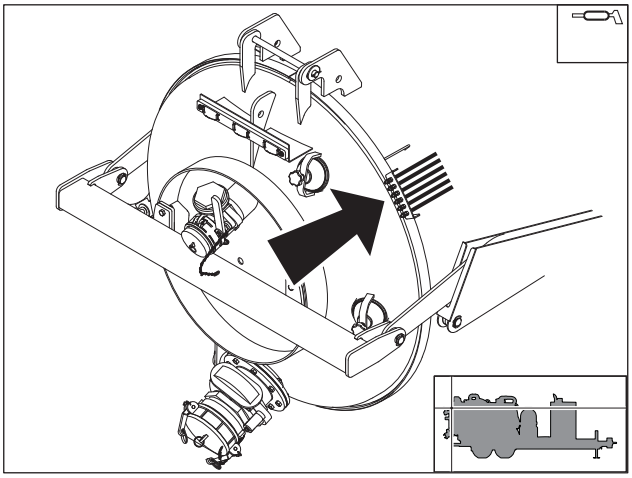


j36om032w.eps

Vacuum Boom

Lube Boom Pivot

Lube six zerks every 50 hours with MPG.



j36om033w.eps

100 Hour

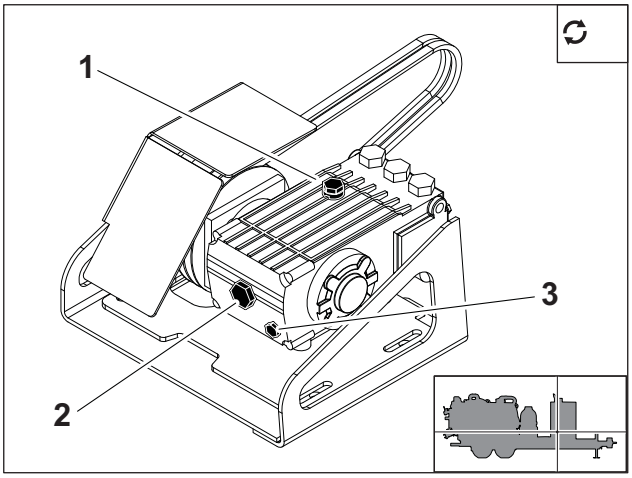
Location	Task	Notes
Vacuum System	Change water pump oil	NDO
	Lube blower bearings	HTG
Debris Tank	Check tank mounting bolts	
Vacuum Boom	Check structure	

Vacuum System

Change Water Pump Oil

Change oil after the first 25 hours of operation and every 100 hours thereafter. Change oil more frequently if working in dusty conditions.

- Drain at drain plug (3) while oil is warm.
- Add NDO at fill (1) until oil is at halfway mark on sight glass (2).

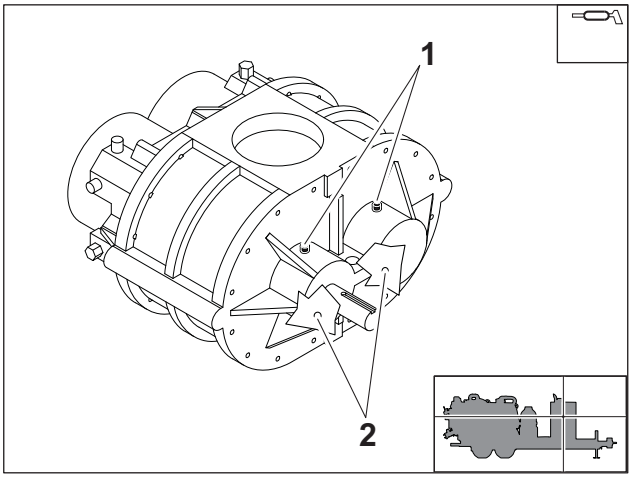


j36om015w.eps

Lube Blower Bearings

Wipe two zerks (1) clean and lube every 100 hours with HTG. Inject grease into zerk until clean grease comes out of relief fittings (2).

NOTICE: Do not inject grease too quickly. Drive shaft seal damage could occur.

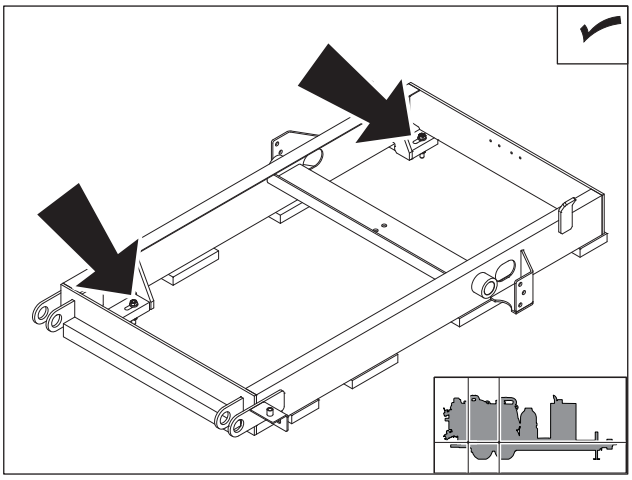


j36om070w.eps

Debris Tank

Check Tank Mounting Bolts

Check vacuum tank mounting bolts (shown, on both sides) every 100 hours for looseness and damage. Tighten or replace as needed.



j36om038w.eps

Vacuum Boom

Check Structure

Check boom elbow every 100 hours. Replace as needed.

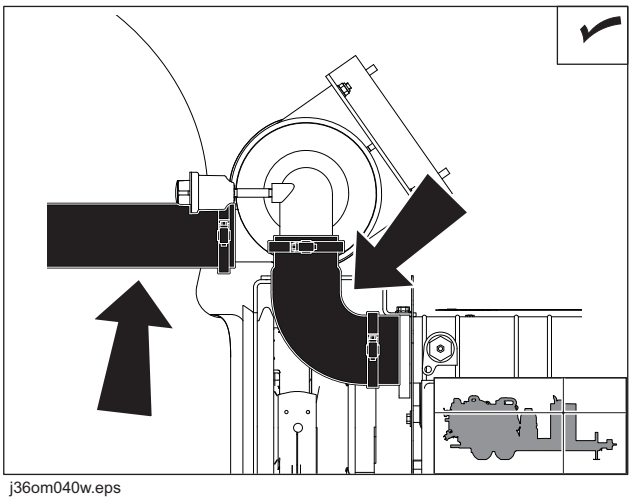
250 Hour

Location	Task	Notes
Vacuum System	Inspect air intake system	

Vacuum System

Inspect Air Intake System

Inspect intake piping for cracked hoses, loose clamps, or punctures. Tighten or replace parts as necessary.



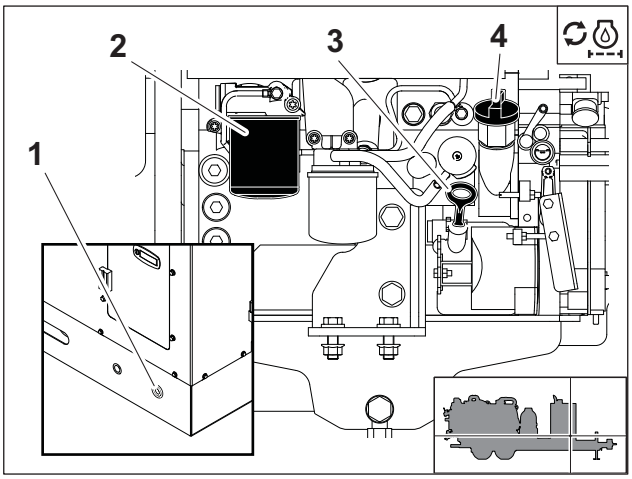
j36om040w.eps

500 Hour

Location	Task	Notes
Vacuum System	Change engine oil and filter	DEO
	Change fuel filter and clean filter screen	

Vacuum System

Change Engine Oil and Filter

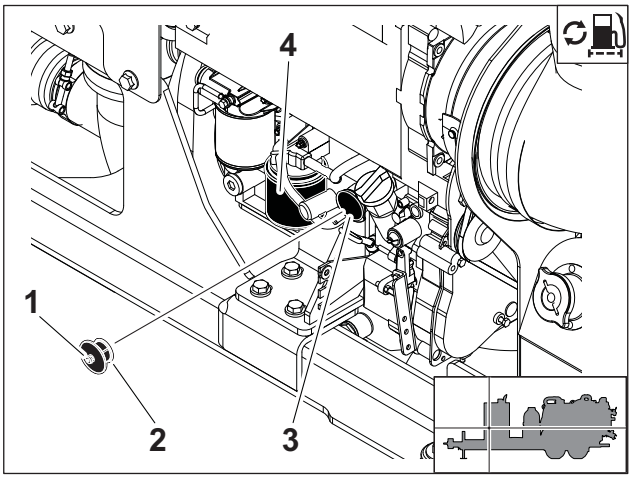


j36om041w.eps

Change oil and filter every 500 hours.

1. Drain crankcase through drain (1) while oil is warm.
2. Replace filter (2) each time oil is changed.
3. Add 6.5 qt (6 L) of DEO at fill neck (4).
4. Verify correct oil level at dipstick (3).

Change Fuel Filter



j36om042w.eps

Replace fuel filter (4) and clean filter screen every 500 hours for normal service. See parts manual or contact your Ditch Witch dealer for correct replacement filter.

To clean filter screen:

IMPORTANT: Do not prefill filters with diesel. Use hand pump to prime.

1. Close fuel shut-off valve.
2. Unscrew nut (1).
3. Remove fuel strainer cover (2).
4. Clean fuel strainer (2) with diesel fuel. Replace if necessary.
5. Place seal (3) in position.
6. Mount fuel strainer cover (2). Tighten screw (1).
7. Check for leaks.

1000 Hour

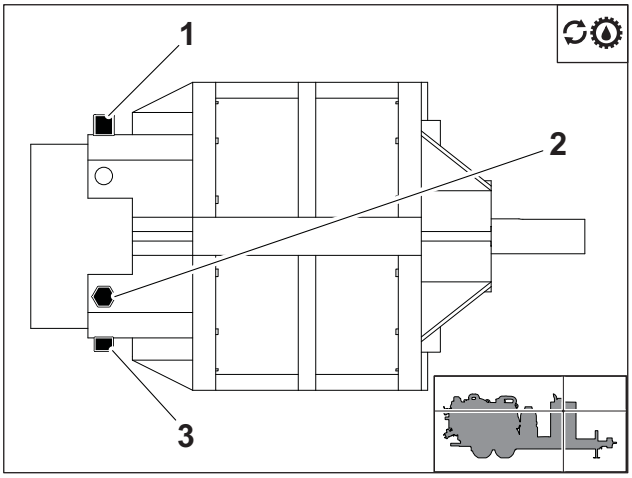
Location	Task	Notes
Vacuum System	Change blower oil	SGL
	Change hydraulic fluid	THF

Vacuum System

Change Blower Oil

Change oil every 1000 hours. Change oil more frequently if working in dusty conditions.

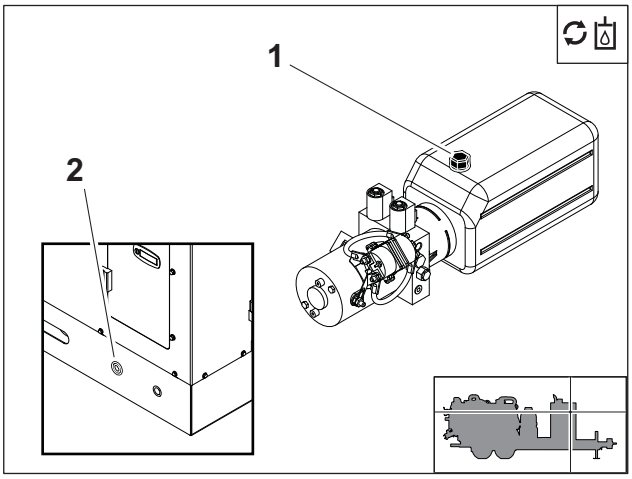
- Drain at drain plug (3) while oil is warm.
- Add SGL at breather (1) until oil is at halfway point on sight glass (2).



j36om064w.eps

Change Hydraulic Fluid

Drain hydraulic fluid (2) and add (1) THF every 1000 hours. Change fluid every 500 hours if jobsite temperature exceeds 100°F (38°C) more than 50% of the time.



j36om065w.eps

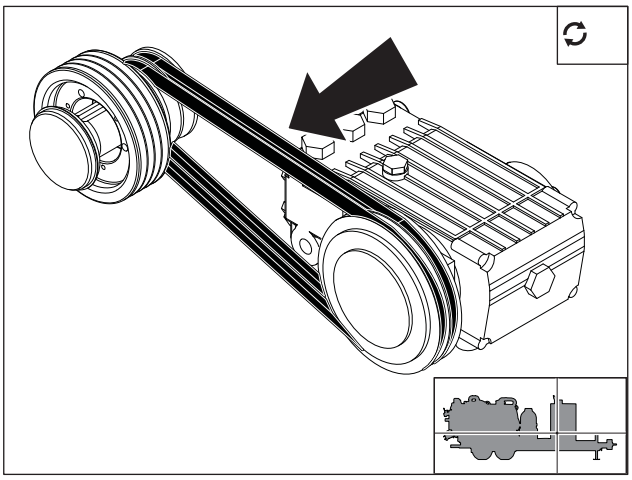
2000 Hour

Location	Task	Notes
Vacuum System	Replace water pump belt	
	Replace blower belt	
	Replace fan belt	

Vacuum System

Replace Water Pump Belt

Replace belt every 2000 hours.



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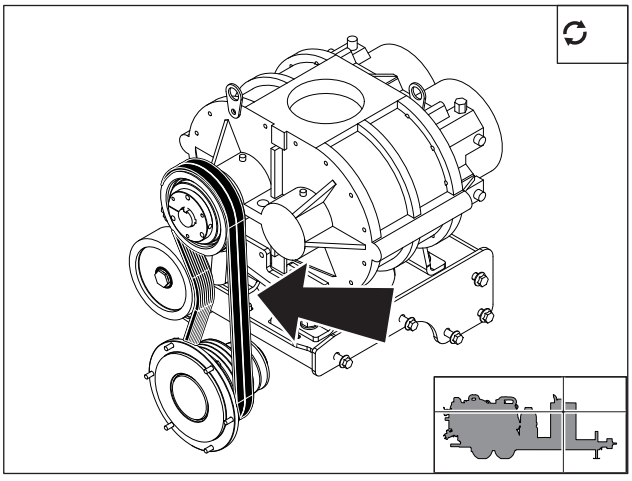
Replace Blower Belt

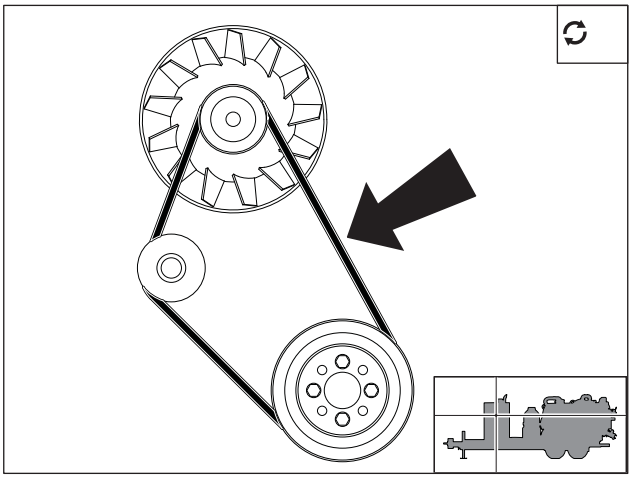
Replace belt every 2000 hours.



j36om044w.eps

Replace Fan Belt

Replace belt every 2000 hours.



j36om061w.eps

As Needed

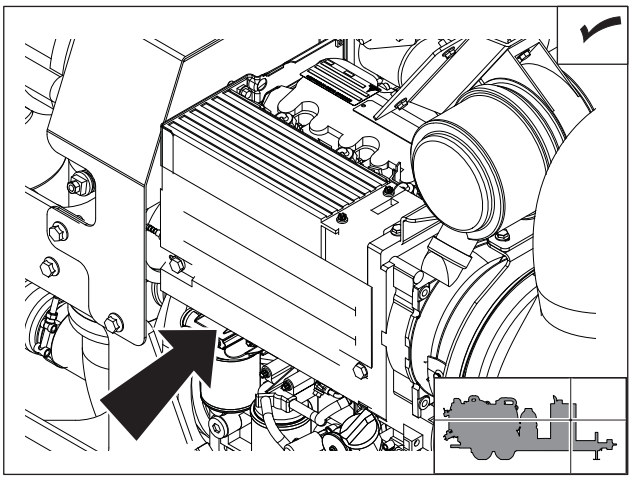
Location	Task	Notes
Vacuum System	Clean engine cooling system	
	Change air filter	
	Adjust fan belt tension	
	Adjust water pump belt tension	
	Change water pump filter	
	Adjust blower belt tension	
	Lube blower for longterm storage	
	Change blower relief air filter	
	Empty cyclonic separator canister	
	Lube reverse flow 4-way valve	MPG
Debris Tank	Clean primary shutoff valve	
	Clean secondary shutoff valve	1200 Tank
Trailer	Add surge brake fluid	DOT 3 or 4

Vacuum System

Clean Engine Cooling System

Remove engine side cover and clean engine cooling system with high-pressure air as needed.

IMPORTANT: Position wire harness through rubber grommet when reinstalling engine side cover.



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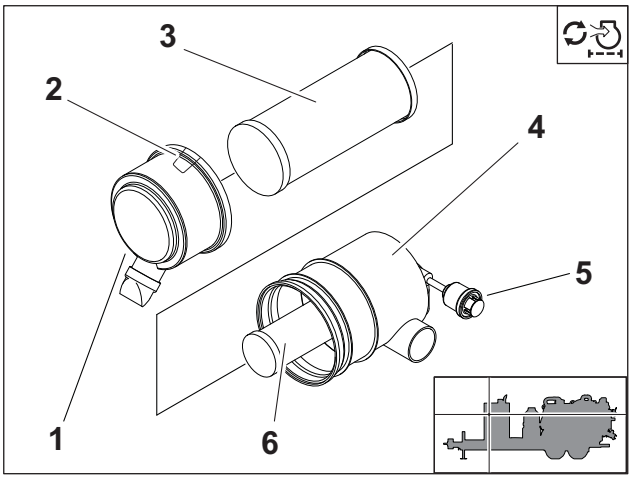
Change Air Filter



j36om049w.eps

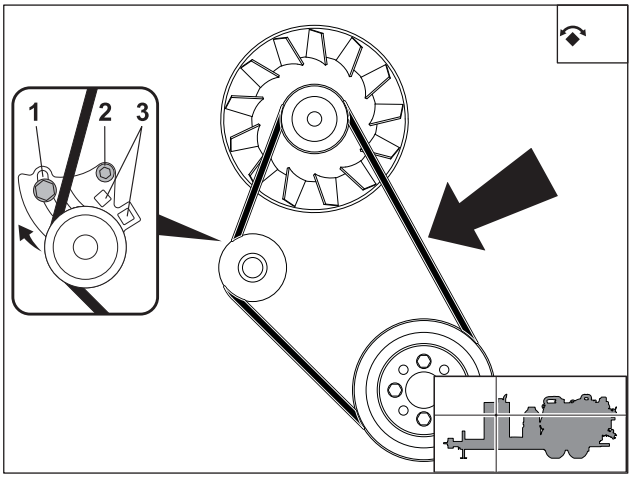
Change air filter element when red band on filter minder (5) is visible. Push button to reset indicator.

To replace air filter:

1. Disengage latches (2) and remove cover (1).
2. Remove the primary (3) and secondary (6) filters from the canister (4).
3. Wipe out the canister (4) and cover (2) with a damp cloth.
4. Install the new secondary and primary filters by hand with a slight turn and firm push to seat the filters in the canister.
5. Install the cover and engage latches.
6. Reset filter minder indicator (5) by pressing the red button.

NOTICE: If the cover contacts the filter before the cover is fully in place, remove cover and push filter element further into housing and try again. The cover should go on without extra force.

Adjust Fan Belt Tension



j36om066w.eps

Adjust belt tension as needed. Belt is properly tensioned when it moves about 3/8" (10 mm) when pushed at the long span (shown).

To adjust belt, move tensioner pulley:

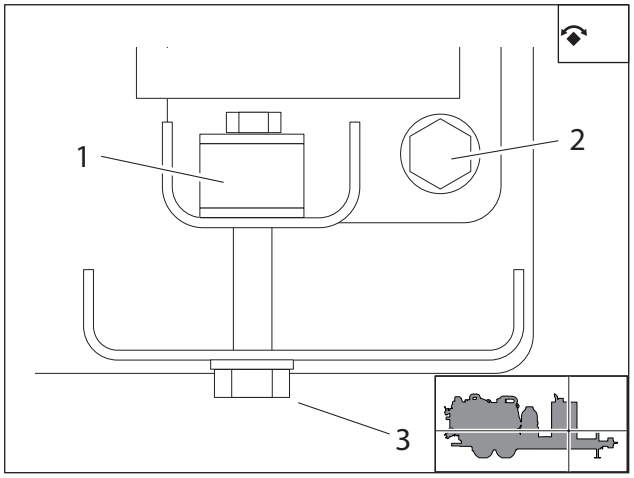
Note: Bolt heads are hidden. Use an 8 mm hex wrench, 17 mm open end wrench, and a 1/2" prybar for this procedure.

1. Loosen socket bolt (2) and bolt (1).
2. Use a prybar in slots (3) to move pulley.
3. Tighten socket bolt (2) and bolt (1).
4. Check tension.

Adjust Water Pump Belt Tension

1. Turn off engine and remove key.
2. Apply moderate thumb pressure to belt between pulleys.

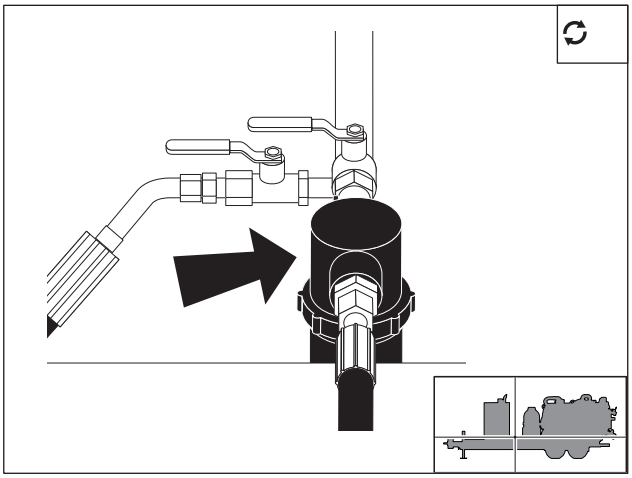
   Belt is properly tensioned when deflection is about .2-.3" (5-8 mm).
3. If needed, loosen four bolts (2) and turn adjustment screw (3) clockwise or counterclockwise until tube (1) touches bracket.
4. Tighten four bolts.



j36om067w.eps

Change Water Pump Filter

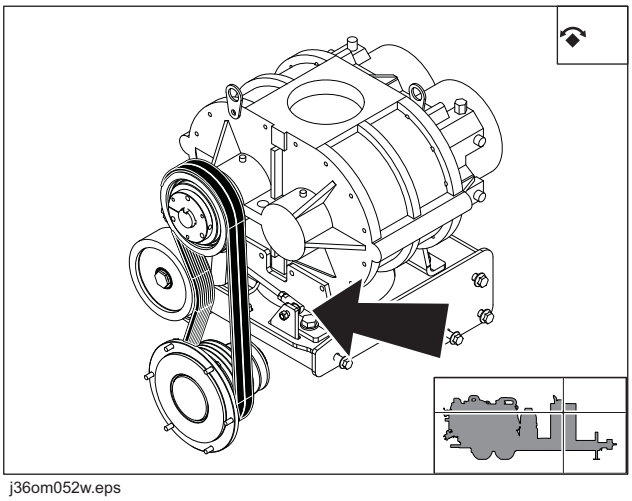
1. Open filter housing.
2. Remove element and rinse housing thoroughly with clean water.
3. Install new element and close filter housing.


j36om050w.eps

Adjust Blower Belt Tension

1. Turn off engine and remove key.
2. Loosen adjustment nut (shown) until tube is loose.
3. Tighten adjustment nut until tube contacts both spring caps.
4. Continue tightening until flat corner of nut is up.
5. Turn nut 3 more times to tighten used belt and 4 more times to tighten new belt.

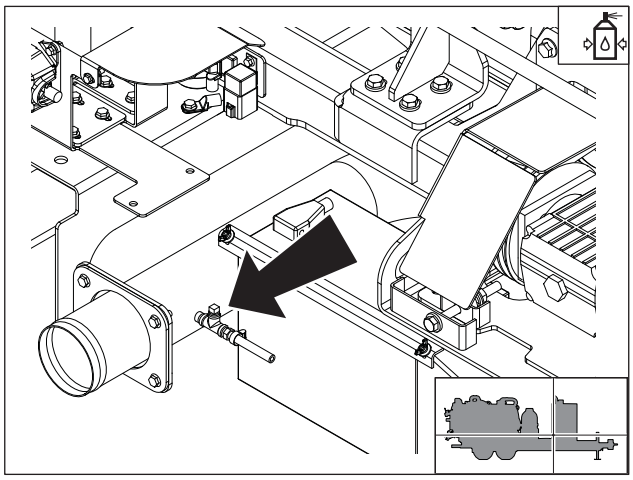
NOTICE: Over-tightening blower drive belts may result in premature blower shaft or engine bearing failure. Follow recommended procedure to ensure maximum component life.


j36om052w.eps

Lube Blower for Long-term Storage

Lubricate blower before long-term storage to help prevent rust and lockup.

1. Remove plug from fitting at filter.
2. Start engine.
3. Spray light oil into port and run unit for 1-2 minutes.
4. Turn off engine.



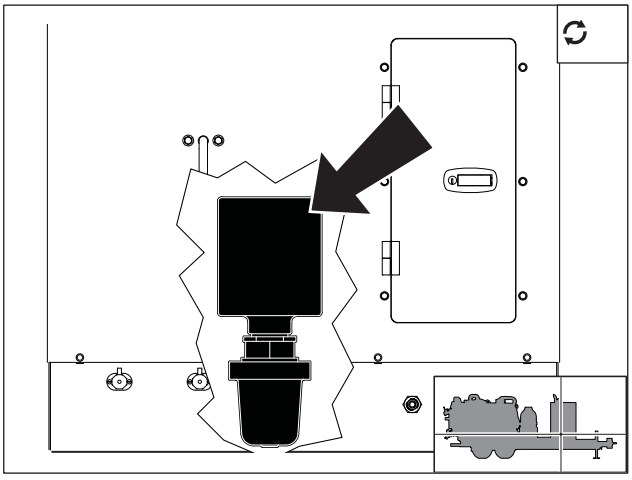
j36om072w.eps

Change Blower Relief Air Filter

Check air filter whenever vacuum gauge goes over 16" (406 mm) of mercury. Change as needed.

NOTICE: Operating system above 16" (406 mm) of mercury may result in blower damage.

1. Remove clamp.
2. Remove filter and discard.
3. Install new filter.
4. Replace clamp.

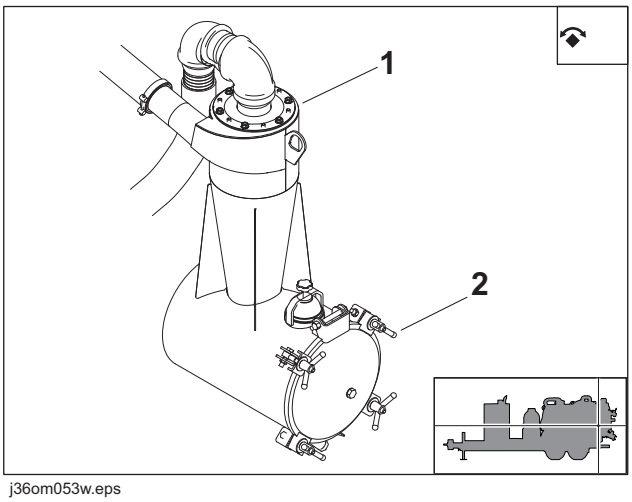


j36om069w.eps

Empty Cyclonic Separator Canister

IMPORTANT: Depressurize tank before emptying cyclonic canister, cleaning filter, clearing hoses or opening any doors.

Empty cyclonic separator canister as needed. Open door and dump tank. Clean out cyclone through upper access door as needed.

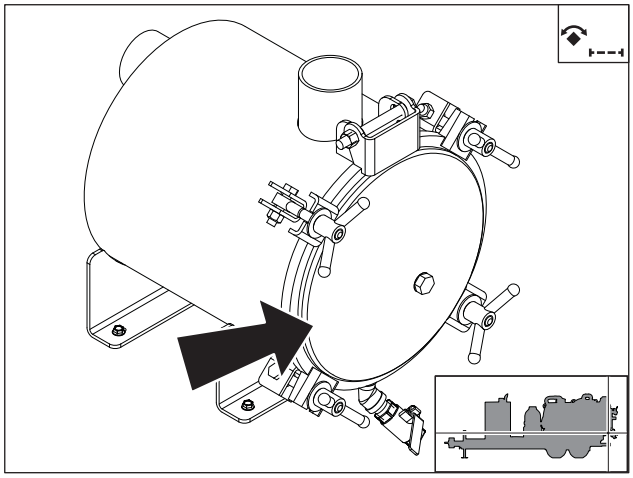


j36om053w.eps

Empty Expansion Canister

IMPORTANT: Depressurize tank before emptying expansion canister, cleaning filter, clearing hoses or opening any doors.

Empty expansion canister as needed. Open door and dump tank.



j36om082w.eps

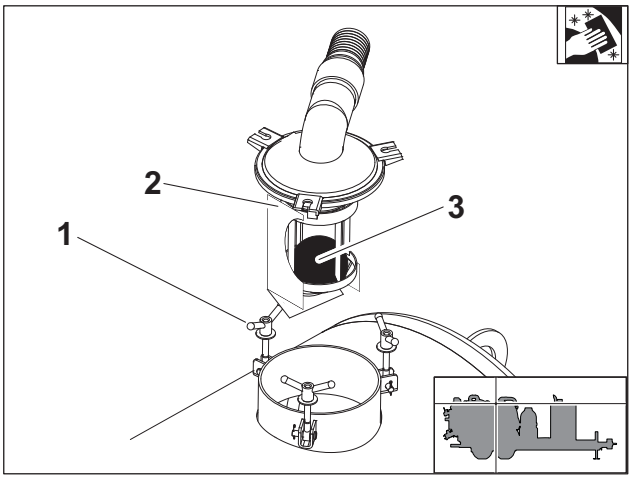
Debris Tank

Clean Primary Shutoff Valve

Clean primary shutoff valve as needed. Replace primary shutoff valve as needed.

To clean:

1. Open tank door. See "Open/Close Tank Door" on page 79.
2. Spray valve housing inside vacuum tank with high-pressure water.
3. Store water pressure hose.
4. Close tank door. See "Open/Close Tank Door" on page 79.



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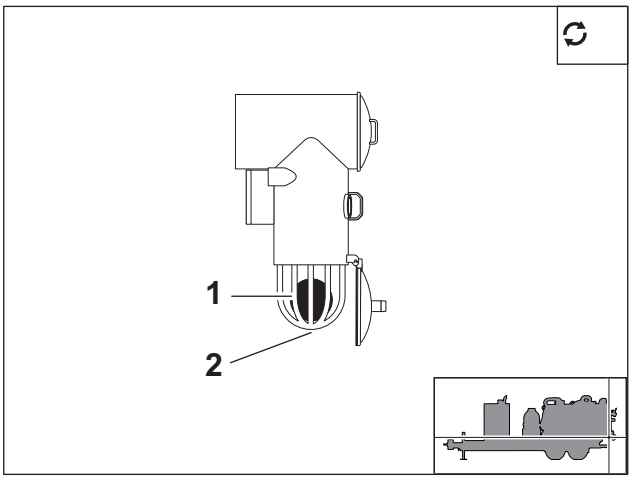
To remove:

1. Loosen three wingnuts (1) and pull out valve housing (2).
2. Remove ball (3).
3. Clean ball and housing with high-pressure water.
4. Replace ball and housing. Orient valve so the cover over ball cage blocks the direct impact of spoils entering the tank from the inlet tube.
5. Tighten wingnuts.

Clean Secondary Shutoff Valve (1200 Tank)



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Clean secondary shutoff valve as needed. Replace secondary shutoff valve as needed.

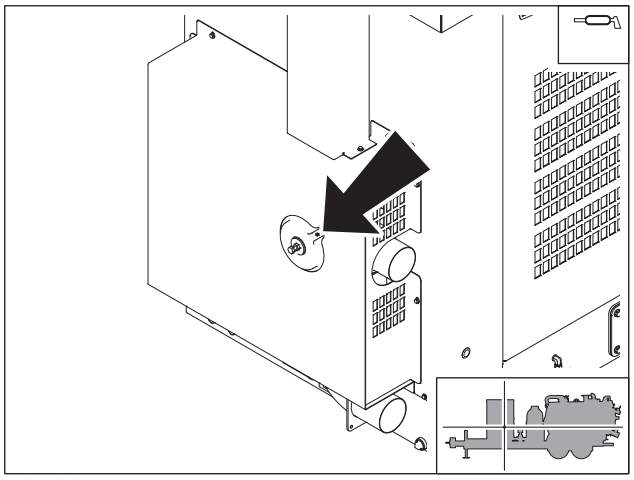
To clean:

1. Loosen wingnuts and open water trap door.
2. Remove filter canister lid and remove filter element.
3. Drain water from element housing.
4. Spray valve housing and rubber seat inside water trap housing with high-pressure water.
5. Disconnect water pressure hose and store properly.
6. Replace water filter canister lid and close water trap door.
7. Tighten wingnuts.

To remove:

1. Open hinged water trap door.
2. Remove three fasteners inside water trap to remove ball housing (2).
3. Clean ball (1) and housing with high pressure water.
4. Replace ball and housing.
5. Close water trap door and tighten wingnuts.

Lube Reverse Flow 4-Way Valve

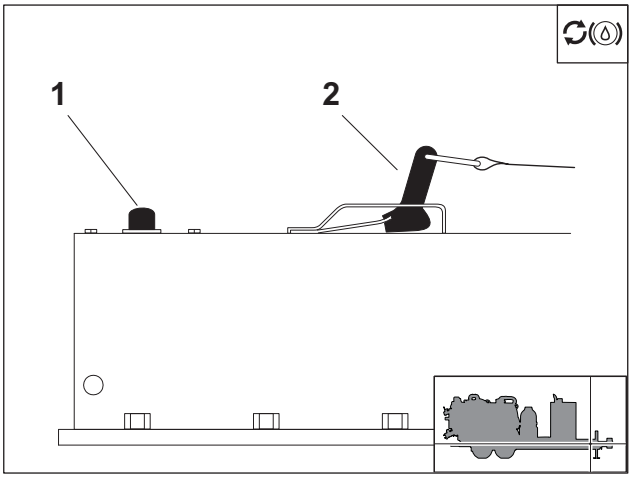

j43om046h.eps

Lube reverse flow 4-way valve at zerk (shown) with MPG as needed. Also open left access panel of power unit and lube zerk on other side of valve.

Trailer

Add Surge Brake Fluid

Add surge brake fluid at cap (1) as needed and bleed brakes.



j36om056w.eps

1. Remove lever guide and flat emergency lever spring by removing two 5/16" hex head bolts and lock washers.
2. Using short strokes, pull forward on emergency lever (2) until brake fluid in master cylinder stops bubbling.
3. Attach bleeder hose to bleeder valve on one wheel and submerge other end of hose into a transparent container partially filled with brake fluid.
4. Loosen bleeder valve one turn and use emergency lever to pump master cylinder. Continue to pump the lever until bubbles no longer appear in brake fluid in container.

NOTICE: Check fluid level in master cylinder every 4-5 strokes and add fluid as necessary to keep master cylinder at least half full while bleeding brakes.

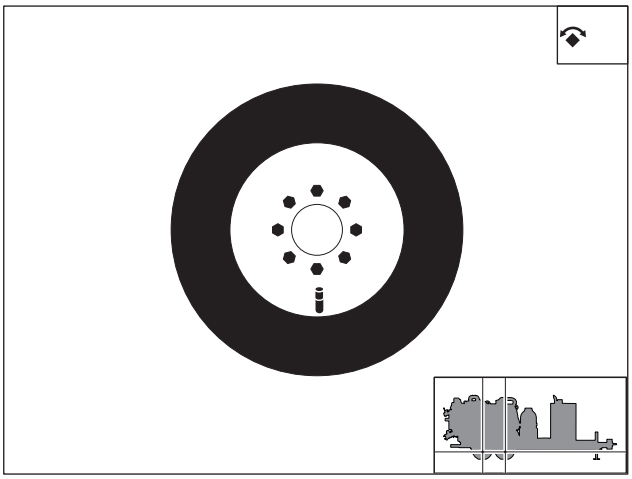
5. When bubbles stop, close bleeder valve and repeat process on remaining wheels.
6. After all wheels have been bled, fill master cylinder and attach cap securely.
7. Install emergency lever spring and lever guide using hex head bolts and lock washers.
8. Test brakes.
   - Pull emergency lever forward until it locks into its second notch.
   - Attempt to rotate all wheels in forward direction.
   - If any wheel rotates, adjust brakes.

200 Mile

Location	Task	Notes
Trailer	Adjust electric brakes	Initial
	Adjust hydraulic brakes	Initial

Trailer

Adjust Electric Brakes (Initial)


j36om045w.eps

Adjust brakes after 200 miles (320 km).

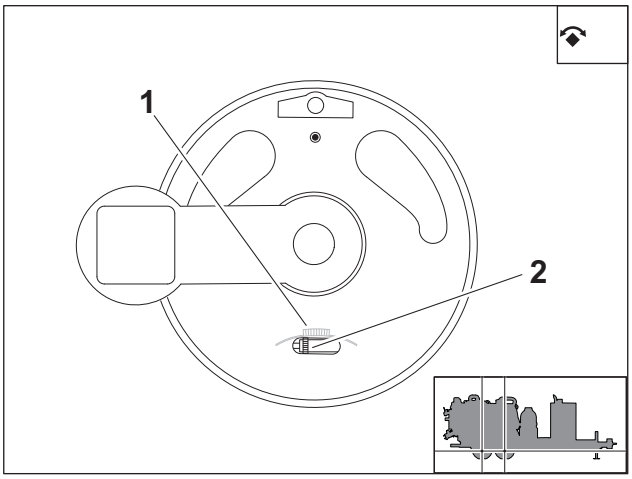
1. Place adequate jack stands under frame rails and remove wheels.
2. Remove cover from adjusting slot on bottom of backing plate.
3. Rotate adjuster starwheel with screwdriver or brake spoon to expand brake shoes. Adjust until drum is very difficult to turn by hand.
4. Rotate starwheel the other direction until drum turns with slight drag.
5. Replace adjusting slot cover and replace wheel.
6. Repeat procedure for all remaining brakes.
7. Remove jack stands and lower wheels to ground.

Adjust Hydraulic Brakes (Initial)

Adjust hydraulic brakes after 200 miles (320 km).

WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

1. Use a jack and suitable jack stands to raise wheels so that wheels can be rotated by hand.
2. Rotate wheel forward by hand to reposition free backing primary brake shoe.
3. Remove adjusting plug from backing plate at wheel.
4. Use a slender screwdriver or similar tool to push the adjuster screw spring (1) away from the adjuster assembly.
5. At the same time, use a brake adjusting tool to tighten adjuster assembly (2). Adjust until brake linings become tight enough that wheel cannot be turned by hand, then back off 11 clicks for brakes that have not been used, and 15 clicks for brakes already burnished in.



j36om046w.eps

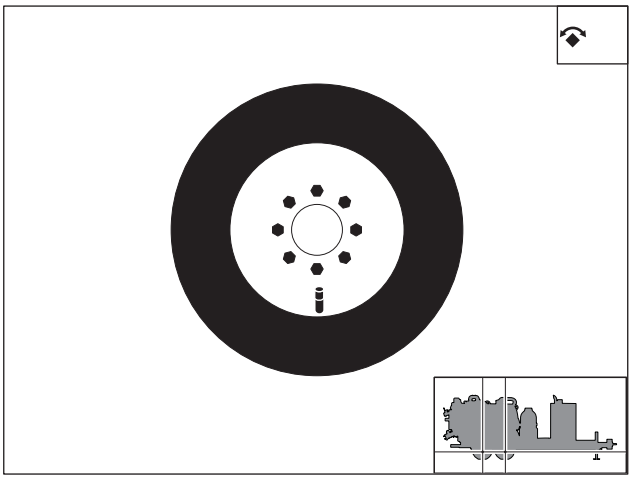
6. Rotate wheel forward by hand. Wheel should rotate freely.
7. Replace adjusting plug in backing plate.
8. Repeat adjustment procedure at each wheel. To ensure even braking, make sure that all wheels have approximately the same amount of drag.

3000 Mile

Location	Task	Notes
Trailer	Adjust electric brakes	
	Adjust hydraulic brakes	

Trailer

Adjust Electric Brakes


j36om045w.eps

Adjust brakes every 3000 miles (5000 km).

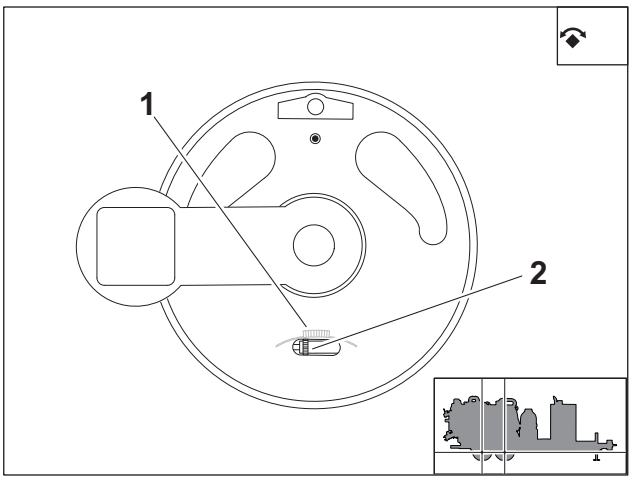
1. Place adequate jack stands under frame rails and remove wheels.
2. Remove cover from adjusting slot on bottom of backing plate.
3. Rotate adjuster starwheel with screwdriver or brake spoon to expand brake shoes. Adjust until drum is very difficult to turn by hand.
4. Rotate starwheel the other direction until drum turns with slight drag.
5. Replace adjusting slot cover and replace wheel.
6. Repeat procedure for all remaining brakes.
7. Remove jack stands and lower wheels to ground.

Adjust Hydraulic Brakes

Adjust hydraulic brakes every 3000 miles (5000 km).

⚠ WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

1. Use a jack and suitable jack stands to raise wheels so that wheels can be rotated by hand.
2. Rotate wheel forward by hand to reposition free backing primary brake shoe.
3. Remove adjusting plug from backing plate at wheel.
4. Use a slender screwdriver or similar tool to push the adjuster screw spring (1) away from the adjuster assembly.
5. At the same time, use a brake adjusting tool to tighten adjuster assembly (2). Adjust until brake linings become tight enough that wheel cannot be turned by hand, then back off 11 clicks for brakes that have not been used, and 15 clicks for brakes already burnished in.



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6. Rotate wheel forward by hand. Wheel should rotate freely.
7. Replace adjusting plug in backing plate.
8. Repeat adjustment procedure at each wheel. To ensure even braking, make sure that all wheels have approximately the same amount of drag.

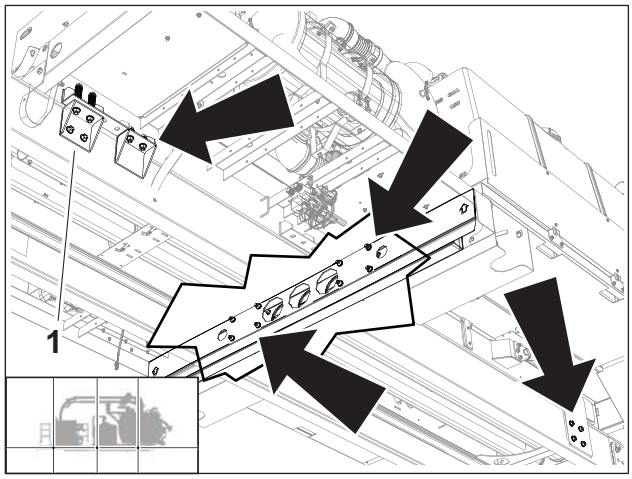
10,000 Mile

Location	Task	Notes
Truck	Check mounting bolts and springs	
	Check accessory mounting bolts	

Truck

Check Mounting Bolts and Springs

Check mounting bolts and springs (shown, underneath and both sides) every 10,000 miles for looseness and damage. Springs (1) should be 3" (76 mm). Loosen or tighten bolt to adjust spring length. Tighten all other indicated hardware to 240 ft•lb (325 N•m).



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Check Accessory Mounting Bolts

Check accessory (fender, hitch, water heater, bumper, skid extension, front tool rack) mounting bolts every 10,000 miles for looseness and damage. Tighten or replace as needed.

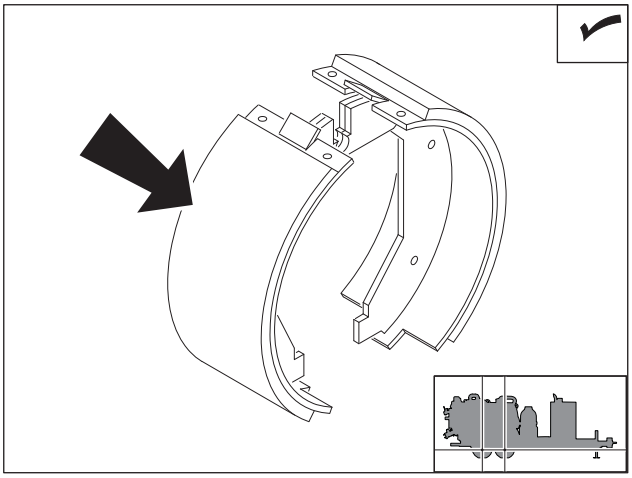
12,000 Mile

Location	Task	Notes
Trailer	Inspect brake shoes and linings	
	Adjust and lubricate bearings	

Trailer

Inspect Brake Shoes and Linings

Inspect shoes and linings every 12 months or 12,000 miles (20 000 km) for wear. When lining is worn to 1/16" (2 mm) or less, replace linings. Replace shoe and lining if contaminated by oil.



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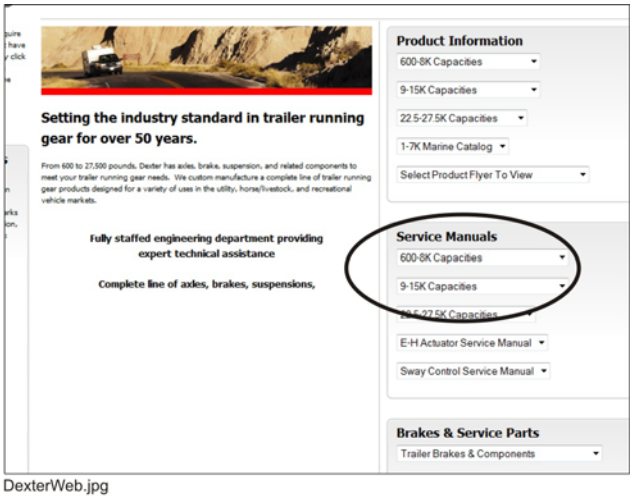
Adjust and Lubricate Bearings

See the your Dexter® Operation Maintenance Service manual for more information. If you do not have that manual, go to the literature section on the Dexter Axle website (www.dexteraxle.com/literature1) for instructions. In the Service Manuals box, select the "Hubs, Drums and Bearings" publication from the drop down menu under the correct capacity for your trailer.



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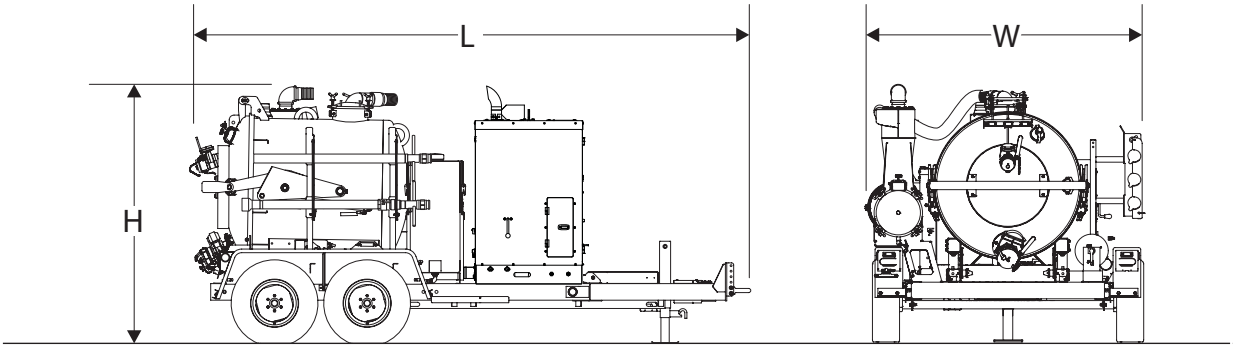
Specifications

FX50-300



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Dimensions		U.S.	Metric
L	Length	222 in	5.6 m
H	Height	92 in	2.3 m
W	Width	96 in	2.4 m
Dry weight		7150 lb	3243 kg
Weight with full tanks (water)		10,350 lb	4695 kg

Tank	U.S.	Metric
Capacity	300 gal	1136 L
Length	66 in	1.7 m
Diameter	50 in	1.3 m
Drain valve size	6 in	152 mm
Inlet valve size	4 in	102 mm

Engine		**U.S.**	**Metric**
Deutz D2011L03i, diesel			
	Cooling medium	oil	
	Aspiration:	natural	
	Number of cylinders:	3	
	Displacement	142 in ^{3}	2.3 L
	Bore	3.7 in	94 mm
	Stroke	4.4 in	112 mm
Engine manufacturer's gross power rating (per SAE 1995)		48.7 hp	36.3 kW
Rated engine speed		2800 rpm	2800 rpm
Emissions compliance: EPA Tier 4i, EU Stage IIIA			

Hydraulic system	**U.S.**	**Metric**
Pressure	2500 psi	172 bar
Drive type	DC	
Tank lift cylinder size (2)	3 in	76 mm
Maximum tilt angle	45°	45°

Battery
SAE res. cap. 195 min; SAE cold crank @ 0°F (-18°C) 950A, 12V

Noise levels
Operator 82 dBA sound pressure per ISO 6394, at operator ear 25 ft (7.6 m) behind centerline of engine power pack. Exterior 110 dBA sound power per ISO 6393.

Vacuum system	U.S.	Metric
Drive type	belt	
Displacement	1020 cfm	28.8 m^3/min
Maximum vacuum	16 in Hg	405 mm Hg
Filter type	washable polyester	
Filter area	100 ft^2	9.3 m^2
Suction hose size	4 in	102 mm

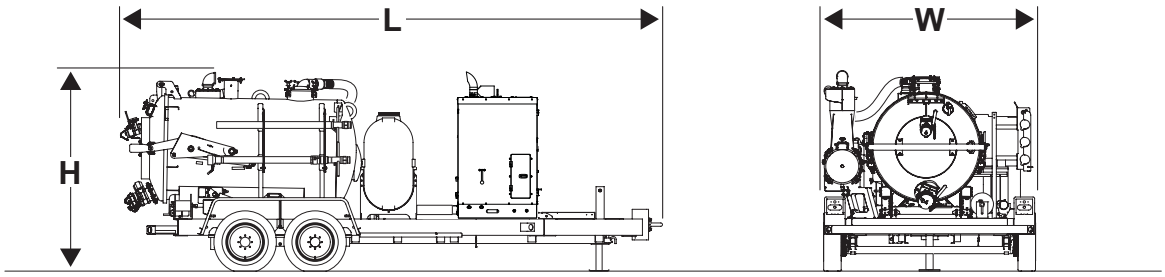
Water pump system	U.S.	Metric
Maximum pressure	3000 psi	207 bar
Flow	5.1 gpm	19.3 L/min
Hose reel capacity (locking)	50 ft	15.3 m
Antifreeze	50/50 water/antifreeze mix	
Clutch type	electric with auto de-clutch	

Fluid capacities	U.S.	Metric
Engine oil with filter (initial fill)	8.5 qt	8 L
Engine oil with filter (refill)	6.5 qt	6 L
Fuel tank	19 gal	71.9 L
Vacuum pump	1.5 qt	1.4 L
Hydraulic reservoir	2 gal	7.6 L
Water pump	41 oz	1.2 L
Water tank	200 gal	757 L

T9SE6/T9SH6 Trailer		U.S.	Metric
Dimensions			
	Clearance (at jack foot pad)	12 in	305 mm
	Adj. coupler height	18-24 in	457-610 mm
	Width between fenders	76 in	1.9 m
	Width outside fenders	96 in	2.4 m
General			
	Number of axles	2	
	Coupler (square mount drawbar)	3 in or 2.5 in	76 mm or 64 mm
	Type of brakes	electric or hydraulic surge	
	Lug nut torque	95 ft•lb	129 N•m
	Hitch bolt torque	200 ft•lb	271 N•m
	Electrical system	12V DC	
Tire			
	ST235/85R16, E	80 psi	5.5 bar
Load rating			
	Tongue weight (empty)	1200 lb	544 kg
	Tongue weight (full water)	1125 lb	510 kg
	Max tongue load	1500 lb	680 kg
	GVWR (gross vehicle weight rating)	10,000 lb	4536 kg
	GAWR (gross axle weight rating, each)	5000 lb	2273 kg

Load ratings for speeds up to 65 mph (104 km/h).

FX50-800



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Dimensions		U.S.	Metric
L	Length	263 in	6.7 m
H	Height	92 in	2.3 m
W	Width	100.5 in	2.55 m
Dry weight		9045 lb	4103 kg
Weight with full tanks (water)		17,135 lb	7772 kg

Tank	U.S.	Metric
Capacity	800 gal	3028 L
Length	98 in	2.5 m
Diameter	50 in	1.3 m
Drain valve size	6 in	152 mm
Inlet valve size	4 in	102 mm

Engine		**U.S.**	**Metric**
Deutz D2011L03i, diesel			
	Cooling medium	oil	
	Aspiration:	natural	
	Number of cylinders:	3	
	Displacement	142 in ^{3}	2.3 L
	Bore	3.7 in	94 mm
	Stroke	4.4 in	112 mm
Engine manufacturer's gross power rating (per SAE 1995)		48.7 hp	36.3 kW
Rated engine speed		2800 rpm	2800 rpm
Emissions compliance: EPA Tier 4i, EU Stage IIIA			

Hydraulic system	**U.S.**	**Metric**
Pressure	2500 psi	172 bar
Drive type	DC	
Tank lift cylinder size (2)	3 in	76 mm
Maximum tilt angle	45°	45°

Battery
SAE res. cap. 195 min; SAE cold crank @ 0°F (-18°C) 950A, 12V

Noise levels
Operator 82 dBA sound pressure per ISO 6394, at operator ear 25 ft (7.6 m) behind centerline of engine power pack. Exterior 110 dBA sound power per ISO 6393.

Vacuum system	U.S.	Metric
Drive type	belt	
Displacement	1020 cfm	28.8 m^3/min
Maximum vacuum	16 in Hg	405 mm Hg
Filter type	washable polyester	
Filter area	100 ft^2	9.3 m^2
Suction hose size	4 in	102 mm

Water pump system	U.S.	Metric
Maximum pressure	3000 psi	207 bar
Flow	5.1 gpm	19.3 L/min
Hose reel capacity (locking)	50 ft	15.3 m
Antifreeze	50/50 water/antifreeze mix	
Clutch type	electric with auto de-clutch	

Fluid capacities	U.S.	Metric
Engine oil with filter	8.0 qt	7.5 L
Fuel tank	19 gal	71.9 L
Vacuum pump	1.5 qt	1.4 L
Hydraulic reservoir	2 gal	7.6 L
Water pump	41 oz	1.2 L
Water tank	200 gal	757 L

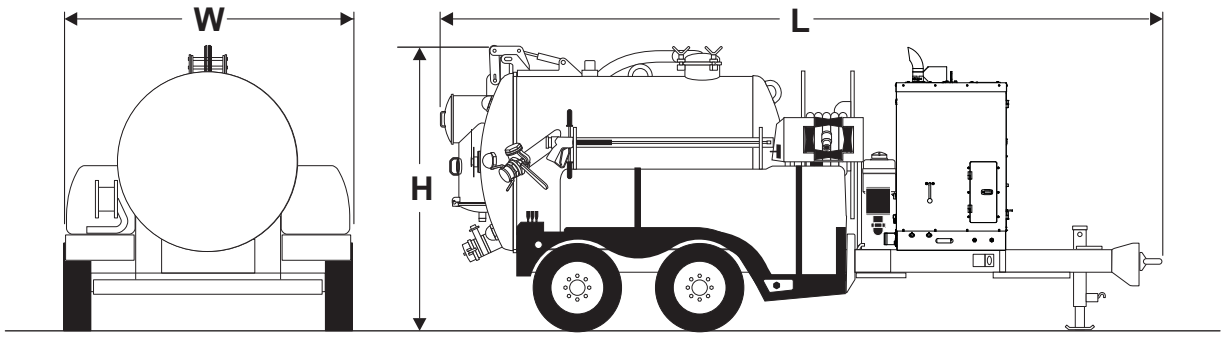
T18S Trailer		U.S.	Metric
Dimensions			
	Clearance (at jack foot pad)	12 in	305 mm
	Adj. coupler height	17-26 in	432-660 mm
	Width between fenders	80.5 in	2 m
	Width outside fenders	100.5 in	2.6 m
General			
	Number of axles	2	
	Coupler (square mount drawbar)	3 in or 2.5 in	76 mm or 64 mm
	Type of brakes	electric	
	Lug nut torque	300 ft•lb	407 N•m
	Hitch bolt torque	200 ft•lb	271 N•m
	Electrical system	12V DC	
Tire			
	215/75R-17.5, H16TL	125 psi	8.6 bar
Load rating			
	Tongue weight (empty)	2325 lb	1055 kg
	Tongue weight (full water)	2235 lb	1014 kg
	Tongue weight, maximum	3100 lb	1406 kg
	GVWR (gross vehicle weight rating)	18,000 lb	8165 kg
	GAWR (gross axle weight rating, each)	8000 lb	3632 kg

Load ratings for speeds up to 65 mph (104 km/h).

T22S Trailer		U.S.	Metric
Dimensions			
	Clearance (at jack foot pad)	17 in	432 mm
	Adj. coupler height	22-31 in	559-787 mm
	Width between fenders	81 in	2.1 m
	Width outside fenders	102 in	2.6 m
General			
	Number of axles	2	
	Coupler (square mount drawbar)	3 in	76 mm
	Type of brakes	electric	
	Lug nut torque	275-325 ft•lb	373-441 N•m
	Hitch bolt torque	200 ft•lb	271 N•m
	Electrical system	12V DC	
Tire			
	ST235/75R17.5, H16TL	125 psi	8.6 bar
Load rating			
	Tongue weight (empty)	2390 lb	1084 kg
	Tongue weight (full water)	2715 lb	1232 kg
	Max tongue load	3500 lb	1588 kg
	GVWR (gross vehicle weight rating)	22,000 lb	9979 kg
	GAWR (gross axle weight rating, each)	10,000 lb	4536 kg

Load ratings for speeds up to 65 mph (104 km/h).

FX50-1200



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Dimensions		U.S.	Metric
L	Length	245 in	6.2 m
H	Height	99 in	2.5 m
W	Width	101.5 in	2.58 m
Dry weight		10,930 lb	4958 kg
Weight with full tanks (water)		24,180 lb	10 968 kg

Tank	U.S.	Metric
Capacity	1200 gal	4542 L
Length	106 in	2.7 m
Diameter	60 in	1.5 m
Drain valve size	6 in	152 mm
Inlet valve size	4 in	102 mm

Engine		U.S.	Metric
Deutz D2011L03i, diesel			
	Cooling medium	oil	
	Aspiration:	natural	
	Number of cylinders:	3	
	Displacement	142 in ^{3}	2.3 L
	Bore	3.7 in	94 mm
	Stroke	4.4 in	112 mm
Engine manufacturer's gross power rating (per SAE 1995)		48.7 hp	36.3 kW
Rated engine speed		2800 rpm	2800 rpm
Emissions compliance: EPA Tier 4i, EU Stage IIIA			

Hydraulic system	U.S.	Metric
Pressure	2500 psi	172 bar
Drive type	DC	
Tank lift cylinder size (1)	4 in	102 mm
Maximum tilt angle	50°	50°

Battery
SAE res. cap. 195 min; SAE cold crank @ 0°F (-18°C) 950A, 12V

Noise levels
Operator 82 dBA sound pressure per ISO 6394, at operator ear 25 ft (7.6 m) behind centerline of engine power pack. Exterior 110 dBA sound power per ISO 6393.

Vacuum system	**U.S.**	**Metric**
Drive type	belt	
Displacement	1020 cfm	28.8 m^3/min
Maximum vacuum	16 in Hg	405 mm Hg
Filter type	washable polyester	
Filter area	100 ft^2	9.3 m^2
Suction hose size	4 in	102 mm

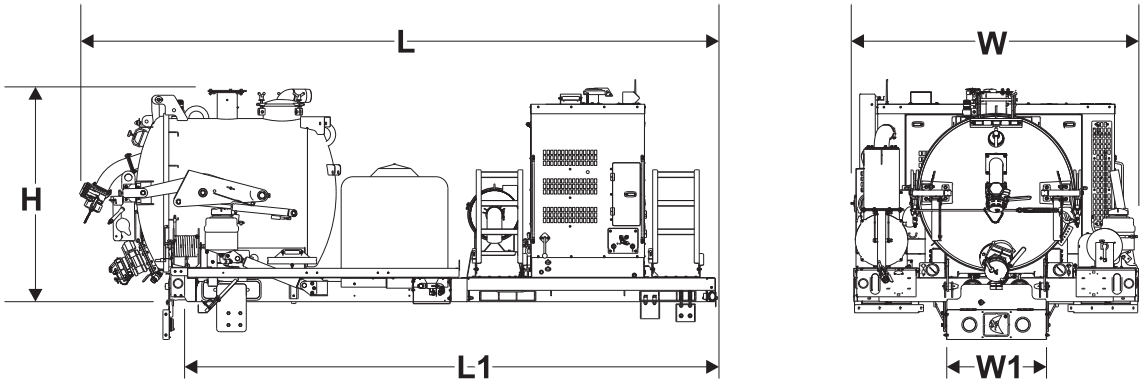
Water pump system	**U.S.**	**Metric**
Maximum pressure	3000 psi	207 bar
Flow	5.1 gpm	19.3 L/min
Hose reel capacity (locking)	50 ft	15.3 m
Antifreeze	50/50 water/antifreeze mix	
Clutch type	electric with auto de-clutch	

Fluid capacities	**U.S.**	**Metric**
Engine oil with filter	8.0 qt	7.5 L
Fuel tank	19 gal	71.9 L
Vacuum pump	1.5 qt	1.4 L
Hydraulic reservoir	2 gal	7.6 L
Water pump	41 oz	1.2 L
Water tank	500 gal	1892 L

T26S Trailer		U.S.	Metric
Dimensions			
	Clearance (at jack foot pad)	12 in	305 mm
	Adj. coupler height	18-27 in	457-686 mm
	Width between fenders	50 in	1.3 m
	Width outside fenders	100.5 in	2.6 m
General			
	Number of axles	2	
	Coupler (square mount drawbar)	3 in or 2.5 in	76 mm or 64 mm
	Type of brakes	electric	
	Lug nut torque	190-210 ft•lb	258-285 N•m
	Hitch bolt torque	300 ft•lb	407 N•m
	Electrical system	12V DC	
Tire			
	ST235/85R16, F	95 psi	6.5 bar
Load rating			
	Tongue weight (empty)	2450 lb	1111 kg
	Tongue weight (full water)	3100 lb	1406 kg
	GVWR (gross vehicle weight rating)	26,000 lb	11 793 kg
	GAWR (gross axle weight rating, each)	12,000 lb	5443 kg

Load ratings for speeds up to 65 mph (104 km/h).

FXT50-500



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Dimensions		U.S.	Metric
L	Overall length	214 in	5.4 m
L1	Length sitting on truck frame	178 in	4.5 m
H	Height with boom	93 in	2.4 m
H1	Height without boom	79 in	2 m
W	Overall width	96 in	2.4 m
W1	Width sitting on truck frame	34 in	864 mm
Dry weight *		6175 lb	2801 kg
Weight with all tanks filled with water		12,013 lb	5449 kg

Truck Information	U.S.	Metric
Axle requirement: single		
Recommended truck GVWR	25950 lb	11771 kg

Vac Tank	U.S.	Metric
Capacity	500 gal	1893 L
Length	62 in	1.6 m
Diameter	50 in	1.3 m
Drain valve size	6 in	152 mm
Inlet valve size	4 in	102 mm

Engine		U.S.	Metric
Deutz D2011L03i, diesel			
	Cooling medium	oil	
	Aspiration:	natural	
	Number of cylinders:	3	
	Displacement	142 in ^{3}	2.3 L
	Bore	3.7 in	94 mm
	Stroke	4.4 in	112 mm
Engine manufacturer's gross power rating (per SAE 1995)		48.7 hp	36.3 kW
Rated engine speed		2800 rpm	2800 rpm
Emissions compliance: EPA Tier 4i, EU Stage IIIA			

Hydraulic system	U.S.	Metric
Pressure	2500 psi	172 bar
Drive type	engine-driven gear pump	
Tank lift cylinder size (2)	2.5 in	63.5 mm
Maximum tilt angle	45°	45°

Battery
SAE res. cap. 195 min; SAE cold crank @ 0°F (-18°C) 950A, 12V electrical system

Vacuum system	U.S.	Metric
Drive type	belt	
Displacement	1020 cfm	28.8 m^3/min
Maximum vacuum	16 in Hg	406 mm Hg
Filter type	washable polyester	
Filter area	100 ft^2	9.3 m^2
Suction hose size	4 in	102 mm

Water system	U.S.	Metric
Maximum pressure	3000 psi	207 bar
Flow	5.1 gpm	19.3 L/min
Hose reel capacity (locking)	50 ft	15.2 m
Antifreeze	50/50 water/antifreeze mix	
Clutch type	electric with auto de-clutch	

Fluid capacities	U.S.	Metric
Engine oil with filter	7.0 qt	6.6 L
Fuel tank	24 gal	91 L
Vacuum pump	1.5 qt	1.4 L
Hydraulic reservoir	6.3 gal	23.8 L
Water pump oil	41 oz	1.2 L
Water tank	200 gal	757 L

Noise levels (without reverse flow)

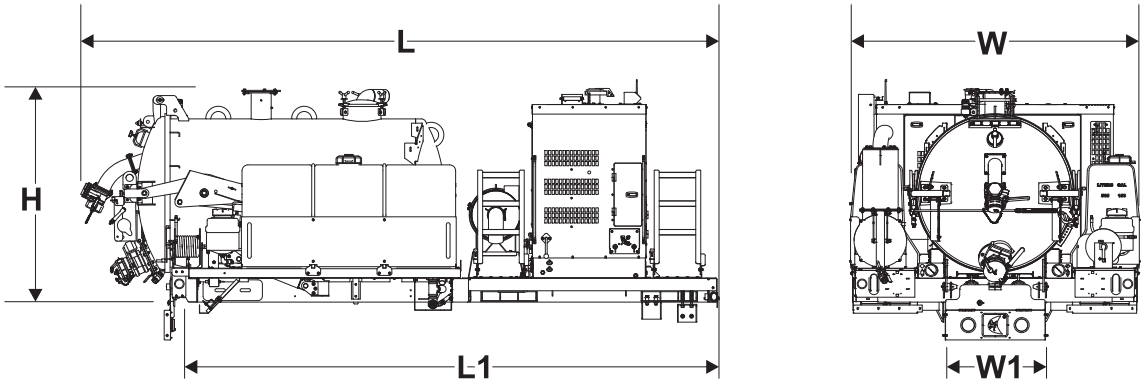
Operator 82 dBA sound pressure per ISO 6394, at operator ear 27 ft (8 m) behind power unit.
Exterior 110 dBA sound power per ISO 6393.

Noise levels (with reverse flow)

Suction mode:
Operator 83 dBA sound pressure per ISO 6394, at operator ear 27 ft (8 m) behind power unit.
Exterior 112 dBA sound power per ISO 6393.

Reverse flow mode:
Operator 83 dBA sound pressure per ISO 6394, at operator ear 27 ft (8 m) behind power unit.
Exterior 110 dBA sound power per ISO 6393.

FXT50-800



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Single Axle

Dimensions		U.S.	Metric
L	Overall length	214 in	5.4 m
L1	Length sitting on truck frame	178 in	4.5 m
H	Height with boom	93 in	2.4 m
H1	Height without boom	79 in	2 m
W	Overall Width	96 in	2.4 m
W1	Width sitting on truck frame	34 in	864 mm
Dry weight *		6700 lb	3039 kg
Weight with all tanks filled with water		16,708 lb	7578.6 kg

Truck Information	U.S.	Metric
Axle requirement: single		
Recommended truck GVWR	33000 lb	14968.5 kg

Tandem Axle

Dimensions		U.S.	Metric
L	Overall length	235 in	6.0 m
L1	Length sitting on truck frame	199 in	5.1 m
H	Height with boom	93 in	2.4 m
H1	Height without boom	79 in	2 m
W	Overall Width	96 in	2.4 m
W1	Width sitting on truck frame	34 in	864 mm
Dry weight *		7100 lb	3220.5 kg
Weight with all tanks filled with water		17,108 lb	7760.1 kg

Truck Information	U.S.	Metric
Axle requirement: Tandem		
Recommended truck GVWR	52,000 lb	23 586.8 kg

FXT50-800 Performance

Vac Tank	U.S.	Metric
Capacity	800 gal	3028 L
Length	98 in	2.5 m
Diameter	50 in	1.3 m
Drain valve size	6 in	152 mm
Inlet valve size	4 in	102 mm

Engine		U.S.	Metric
Deutz D2011L03i, diesel			
	Cooling medium	oil	
	Aspiration:	natural	
	Number of cylinders:	3	
	Displacement	142 in ^{3}	2.3 L
	Bore	3.7 in	94 mm
	Stroke	4.4 in	112 mm
Engine manufacturer's gross power rating (per SAE 1995)		48.7 hp	36.3 kW
Rated engine speed		2800 rpm	2800 rpm
Emissions compliance: EPA Tier 4i, EU Stage IIIA			

Hydraulic system	U.S.	Metric
Pressure	2500 psi	172 bar
Drive type	engine-driven gear pump	
Tank lift cylinder size (2)	2.5 in	63.5 mm
Maximum tilt angle	45°	45°

Battery
SAE res. cap. 195 min; SAE cold crank @ 0°F (-18°C) 950A, 12V

Vacuum system	U.S.	Metric
Drive type	belt	
2-Lobe blower displacement	1020 cfm	28.9 m^3/min
Maximum vacuum	16 in Hg	405 mm Hg
Filter type	washable polyester	
Filter area	100 ft^2	9.3 m^2
Suction hose size	4 in	102 mm

Water system	U.S.	Metric
Maximum pressure	3000 psi	207 bar
Flow	5.1 gpm	19.3 L/min
Hose reel capacity (locking)	50 ft	15.2 m
Antifreeze	50/50 water/antifreeze mix	
Clutch type	electric with auto de-clutch	

Fluid capacities	U.S.	Metric
Engine oil with filter	7.0 qt	6.6 L
Fuel tank	24 gal	91 L
Vacuum pump	1.5 qt	1.4 L
Hydraulic reservoir	6.3 gal	23.8 L
Water pump oil	41 oz	1.2 L
Water tank	400 gal	757 L

Noise levels (without reverse flow)

Operator 82 dBA sound pressure per ISO 6394, at operator ear 27 ft (8 m) behind power unit.
Exterior 110 dBA sound power per ISO 6393.

Noise levels (with reverse flow)

Suction mode:
Operator 83 dBA sound pressure per ISO 6394, at operator ear 27 ft (8 m) behind power unit.
Exterior 112 dBA sound power per ISO 6393.

Reverse flow mode:
Operator 83 dBA sound pressure per ISO 6394, at operator ear 27 ft (8 m) behind power unit.
Exterior 110 dBA sound power per ISO 6393.

Air System

10 Series

- Truck PTO driven
- 200 CFM (5.6 m^3/min)
- Selectable operating pressure - 100 or 200 psi (689 or 1379 kPa)
- Air hose: 3/4 in (19 mm), 50 ft (15 m) long
- Approximate weight: 650 lb (295 kg)

12 Series

- Truck PTO driven
- 300 CFM (8.5 m^3/min)
- Selectable operating pressure - 100 or 250 psi (689 or 1724kPa)
- Air hose: 1.0 in (25 mm), 50 ft (15 m) long
- Approximate weight: 1200 lb (544 kg)

Countries in the European Union should have received a Declaration of Conformity (DOC) with this machine similar to the example below.

The Charles Machine Works, Inc.
PO Box 66
1959 West Fir Avenue
Perry, Oklahoma, USA 73077-0066
Phone: 580 572 xxxx
FAX: 580 572 3525

Declares that the product:

Model: **Ditch Witch® XXXX**

Type: **(machine type)**

Engine Power: **xxx kW**

Serial Number: **CMWXXXXXXXXXXXXX**

Conforms to the requirements of:

2006/42/EC Machinery Directive

2014/30/EU Electromagnetic Compatibility Directive

2000/14/EC Noise Emission Directive

Measured sound power level (Annex V): **xxx dBA**
Guaranteed sound power level (Annex V): **xxx dBA**

The Technical Construction File is maintained at the manufacturer's location.

The manufacturer's European representative is:

Ditch Witch Barcelona
International Underground Systems, S.L.
C/EL PLA, 130 * Poligon Industrial El Pla
08980 Sant Feliu De Llobregat * Spain
Phone: +34 93 632 7344
FAX: +34 93 632 7343

Support

Procedure

Notify your dealer immediately of any malfunction or failure of Ditch Witch equipment.

Always give model, serial number, and approximate date of your equipment purchase. This information should be recorded and placed on file by the owner at the time of purchase.

Return damaged parts to dealer for inspection and warranty consideration if in warranty time frame.

Order genuine Ditch Witch replacement or repair parts from your authorized Ditch Witch dealer. Use of another manufacturer's parts may void warranty consideration.

Resources

Publications

Contact your Ditch Witch dealer for publications and videos covering safety, operation, service, and repair of your equipment.

Ditch Witch® Training

For information about on-site, individualized training, contact your Ditch Witch dealer.

Warranty

Ditch Witch® Equipment and Replacement Parts Limited Warranty Policy

Subject to the limitation and exclusions herein, free replacement parts will be provided at any authorized Ditch Witch dealership for any Ditch Witch equipment or parts manufactured by the Ditch Witch factory that fail due to a defect in material or workmanship within one (1) year of first commercial use. Free labor will be provided at any authorized Ditch Witch dealership for installation of parts under this warranty during the first year following "initial commercial" use of the serial-numbered Ditch Witch equipment on which it is installed. The customer is responsible for transporting their equipment to an authorized Ditch Witch dealership for all warranty work.

Exclusions from Product Warranty

- All incidental or consequential damages.
- All defects, damages, or injuries caused by misuse, abuse, improper installation, alteration, neglect, or uses other than those for which products were intended.
- All defects, damages, or injuries caused by improper training, operation, or servicing of products in a manner inconsistent with manufacturer's recommendations.
- All engines and engine accessories (these are covered by original manufacturer's warranty).
- Tires, belts, and other parts which may be subject to another manufacturer's warranty (such warranty will be available to purchaser).
- ALL IMPLIED WARRANTIES NOT EXPRESSLY STATED HEREIN, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY.

IF THE PRODUCTS ARE PURCHASED FOR COMMERCIAL PURPOSES, AS DEFINED BY THE UNIFORM COMMERCIAL CODE, THEN THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF AND THERE ARE NO IMPLIED WARRANTIES OF ANY KIND WHICH EXTEND TO A COMMERCIAL BUYER. ALL OTHER PROVISIONS OF THIS LIMITED WARRANTY APPLY INCLUDING THE DUTIES IMPOSED.

Ditch Witch products have been tested to deliver acceptable performance in most conditions. This does not imply they will deliver acceptable performance in all conditions. Therefore, to assure suitability, products should be operated under anticipated working conditions prior to purchase.

Defects will be determined by an inspection within thirty (30) days of the date of failure of the product or part by Ditch Witch Product Support (DWPS) or its authorized dealer. DWPS will provide the location of its inspection facilities or its nearest authorized dealer upon inquiry. DWPS reserves the right to supply remanufactured replacements parts under this warranty as it deems appropriate.

Extended warranties are available upon request from your local Ditch Witch dealer or the Ditch Witch factory.

Some states do not allow exclusion or limitation of incidental or consequential damages, so above limitation of exclusion may not apply. Further, some states do not allow exclusion of or limitation of how long an implied warranty lasts, so the above limitation may not apply. This limited warranty gives product owner specific legal rights and the product owner may also have other rights which vary from state to state.

For information regarding this limited warranty, contact the DWPS department, P.O. Box 66, Perry, OK 73077-0066, or contact your local dealer.

First version: 1/91; Latest version: 8/16

A Note To Ditch Witch Equipment Owners:

If your equipment was purchased through a Ditch Witch dealer, there is no need to read further.

However, if you purchased from any other source, please fill out the form on the reverse side and return it to us.

This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

(Please Fold Along This Line And Seal At Bottom With Tape)

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO 23 PERRY OKLAHOMA

POSTAGE WILL BE PAID BY

The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989

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The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989

Ditch Witch® Registration Card

Please Type or Print All Information

Purchaser's Company Name

Attention

Street Address or P.O. Box

City County

State Zip Nation

( )

Phone Number With Area Code

Model Serial Number

Attachments/Accessories Serial Numbers

Attachments/Accessories Serial Numbers

Attachments/Accessories Serial Numbers

Name of Ditch Witch Dealership

Your Signature

Ditch Witch® Registration Card

Please Type or Print All Information

Purchaser's Company Name

Attention

Street Address or P.O. Box

City County

State Zip Nation

( )

Phone Number With Area Code

Model Serial Number

Attachments/Accessories Serial Numbers

Attachments/Accessories Serial Numbers

Attachments/Accessories Serial Numbers

Name of Ditch Witch Dealership

Your Signature

Service Record

Service Performed	Date	Hours

Service Performed	Date	Hours

Appendix

Chapter Contents

Tire Safety Information

TIRE SAFETY INFORMATION

1.1. STEPS FOR DETERMINING CORRECT LOAD LIMIT – TRAILER

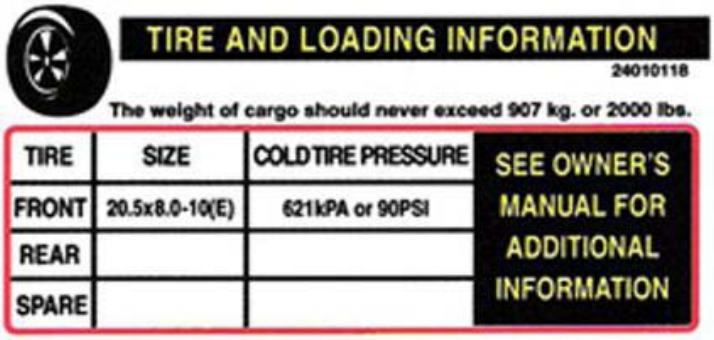
Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal certification/VIN label that is located on the forward half of the left (road) side of the unit. This certification/VIN label will indicate the trailer's Gross Vehicle Weight Rating (GVWR). This is the most the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a particular axle can weigh. If there are multiple axles, the GAWR of each axle will be provided.

If your trailer has a GVWR of 10,000 pounds or less, there is a vehicle placard located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity. Cargo can be added to the trailer, up to the maximum weight specified on the placard. The combined weight of the cargo is provided as a single number. In any case, remember: the total weight of a fully loaded trailer can not exceed the stated GVWR.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the trailer is to weigh it at a public scale. Talk to your dealer to discuss the weighing methods needed to capture the various weights related to the trailer. This would include the weight empty or unloaded, weights per axle, wheel, hitch or king-pin, and total weight.

Excessive loads and/or underinflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the certification/VIN label and/or on the Tire Placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

1.1.1. TRAILERS 10,000 POUNDS GVWR OR LESS



Tire and Loading Information Placard – Figure 1-1

1. Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your trailer's placard. See figure 1-1.
2. This figure equals the available amount of cargo load capacity.
3. Determine the combined weight of cargo being loaded on the trailer. That weight may not safely exceed the available cargo load capacity.

The Tire Information Placard is attached adjacent to or near the trailer's VIN (Certification) label at the left front of the trailer.

1.1.2. TRAILERS OVER 10,000 POUNDS GVWR (NOTE: These trailers are not required to have a tire information placard on the trailer.)

1. Determine the empty weight of your trailer by weighing the trailer using a public scale or other means. This step does not have to be repeated.
2. Locate the GVWR (Gross Vehicle Weight Rating) of the trailer on your trailer's VIN (Certification) label.
3. Subtract the empty weight of your trailer from the GVWR stated on the VIN label. That weight is the maximum available cargo capacity of the trailer and must not be exceeded.

1.2. STEPS FOR DETERMINING CORRECT LOAD LIMIT – TOW VEHICLE

1. Locate the statement, "The combined weight of occupants and cargo should never exceed XXX lbs.," on your vehicle's placard.
2. Determine the combined weight of the driver and passengers who will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.
4. The resulting figure equals the available amount of cargo capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.).
5. Determine the combined weight of cargo being loaded on the vehicle. That weight must not exceed the available cargo capacity calculated in Step # 4.
6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle's manual to determine how this weight transfer reduces the available cargo and luggage capacity of your vehicle.

1.3. GLOSSARY OF TIRE TERMINOLOGY

Bead - the part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.
Bead separation - the breakdown of the bond between components in the bead.
Bias ply tire - a pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.
Carcass - the tire structure, except tread and sidewall rubber which, when inflated, bears the load.
Chunking - the breaking away of pieces of the tread or sidewall.
Cold inflation pressure - the pressure in the tire before you drive.
Cord - the strands forming the plies in the tire.
Cord separation - the parting of cords from adjacent rubber compounds.
Cracking - any parting within the tread, sidewall, or inner liner of the tire extending to cord material.
Curb weight - the weight of a vehicle with standard equipment.
Groove - the space between two adjacent tread ribs.
Gross Axle Weight Rating (GAWR) - the maximum weight that any axle can support, as published on the Certification / VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.
Gross Vehicle Weight Rating (GVWR) - the maximum weight of the fully loaded trailer, as published on the Certification / VIN label. Actual weight determined by weighing trailer on a public scale, without being attached to the towing vehicle.
Tongue Weight - the downward force exerted on the hitch ball or lunette by the trailer coupler.
Innerliner - the layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

Innerliner separation - the parting of the innerliner from cord material in the carcass.
Light truck (LT) tire - a tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.
Load rating - the maximum load that a tire is rated to carry for a given inflation pressure.
Maximum load rating - the load rating for a tire at the maximum permissible inflation pressure for that tire.
Maximum permissible inflation pressure - the maximum cold inflation pressure to which a tire may be inflated.
Maximum loaded vehicle weight - the sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.
Outer diameter - the overall diameter of an inflated new tire.
Overall width - the linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.
Ply - a layer of rubber-coated parallel cords.
Ply separation - a parting of rubber compound between adjacent plies.
Pneumatic tire - a mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.
Radial ply tire - a pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.
Recommended inflation pressure - the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.
Rim - a metal support for a tire or a tire and tube assembly upon which the tire beads are seated.
Rim diameter - the nominal diameter of the bead seat.
Rim size designation - the rim diameter and width.
Rim type designation - the industry of manufacturer’s designation for a rim by style or code.
Rim width - the nominal distance between rim flanges.
Sidewall - that portion of a tire between the tread and bead.
Sidewall separation - the parting of the rubber compound from the cord material in the sidewall.
Special Trailer (ST) tire - the "ST" is an indication the tire is for trailer use only.
Tread - that portion of a tire that comes into contact with the road.
Tread rib - a tread section running circumferentially around a tire.
Tread separation - pulling away of the tread from the tire carcass.
Treadwear indicators (TWI) - the projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.
Vehicle maximum load on the tire - the load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.
Vehicle normal load on the tire - the load on an individual tire that is determined by distributing to each axle its share of the curb weight and dividing by 2.

1.4. TIRE SAFETY - EVERYTHING RIDES ON IT

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. This brochure is reproduced in part below. It can be obtained and downloaded from NHTSA, free of charge, from the following web site: http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and trailer load limits (not carrying more weight in your trailer than your tires or trailer can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- ◊ Improve vehicle handling
- ◊ Help protect you and others from avoidable breakdowns and accidents
- ◊ Improve fuel economy
- ◊ Increase the life of your tires.

This booklet presents a comprehensive overview of tire safety, including information on the following topics:

- ◊ Basic tire maintenance
- ◊ Uniform Tire Quality Grading System
- ◊ Fundamental characteristics of tires
- ◊ Tire safety tips.

Use this information to make tire safety a regular part of your trailer maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

1.5. SAFETY FIRST–BASIC TIRE MAINTENANCE

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your trailer. Underinflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and trailer load limits, avoid road hazards, and regularly inspect your tires.

1.5.1. FINDING YOUR TRAILER'S RECOMMENDED TIRE PRESSURE AND LOAD LIMITS

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

- ◊ Recommended tire size
- ◊ Recommended tire inflation pressure
- ◊ Vehicle capacity weight
- ◊ Front and rear gross axle weight ratings

Both placards and certification labels are permanently attached to the trailer near the left front.

1.5.2. UNDERSTANDING TIRE PRESSURE AND LOAD LIMITS

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the trailer. The tire inflation pressure is a number that indicates the amount of air pressure– measured in pounds per square inch (psi) or kilopascals (kpa) –a tire requires to be properly inflated.

This number based on the trailer's design load limit, that is, the greatest amount of weight a trailer can safely carry and the tire size. The proper tire pressure for your trailer is referred to as the "recommended cold inflation pressure." (As you will read below, it is difficult to obtain the recommended tire pressure if your tires are not cold.)

Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the "maximum permissible inflation pressure" on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

1.5.3. CHECKING TIRE PRESSURE

It is important to check your trailer's tire pressure at least once a month for the following reasons:

- ◊ Most tires may naturally lose air over time.
- ◊ Tires can lose air suddenly if you drive over a pothole or other object or if you strike the curb when parking.
- ◊ With radial tires, it is usually not possible to determine underinflation by visual inspection.

For convenience, purchase a tire pressure gauge to keep with your trailer. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure that manufacturers provide reflects the proper psi when a tire is cold. The term cold does not relate to the outside temperature. Rather, a cold tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, you must measure tire pressure when the tires are cold or compensate for the extra pressure in warm tires.

1.5.4. STEPS FOR MAINTAINING PROPER TIRE PRESSURE

Step 1: Locate the recommended tire pressure on the trailer's tire information placard, certification label, or in the owner's manual.
Step 2: Record the tire pressure of all tires.
Step 3: If the tire pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.
Step 4: If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. These "missing" pounds of pressure are what you will need to add.
Step 5: Add the missing pounds of air pressure to each tire that is underinflated.
Step 6: Check all the tires to make sure they have the same air pressure (except in cases in which the front and rear tires are supposed to have different amounts of pressure).

If you have been towing your trailer and think that a tire is underinflated, fill it to the recommended cold inflation pressure indicated on your trailer's tire information placard or certification label. While your tire may still be slightly underinflated due to the extra pounds of pressure in the warm tire, it is safer to drive with air pressure that is slightly lower than the recommended cold inflation pressure than to drive with a significantly underinflated tire. Since this is a temporary fix, don't forget to recheck and adjust the tire's pressure when you can obtain a cold reading.

1.5.5. TIRE SIZE

To maintain tire safety, purchase new tires that are the same size as the trailer's original tires or another size recommended by the manufacturer. Look at the tire information placard, the owner's manual, or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult with your dealer.

1.5.6. TIRE TREAD

The tire tread provides the gripping action and traction that prevent your trailer from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in treadwear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear "even" with the outside of the tread, it is time to replace your tires. Another method for checking tread depth is to place a penny in the tread with Lincoln's head upside down and facing you. If you can see the top of Lincoln's head, you are ready for new tires.

1.5.7. TIRE BALANCE AND WHEEL ALIGNMENT

To avoid vibration or shaking of the trailer when a tire rotates, the tire must be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the trailer's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician.

1.5.8. TIRE REPAIR

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

1.5.9. TIRE FUNDAMENTALS

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

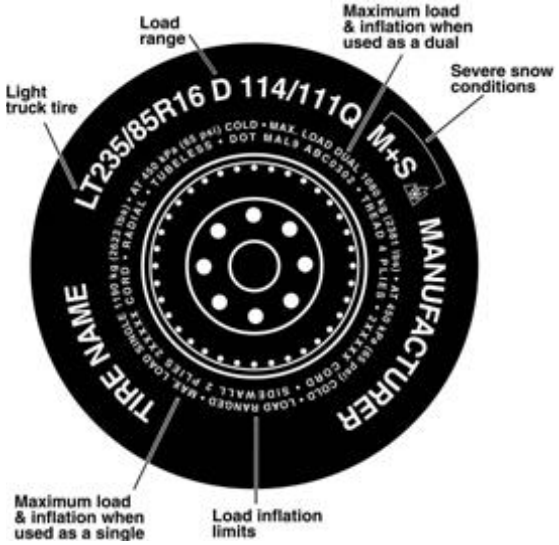
1.5.9.1. UTQGS Information

Treadwear Number - indicates the tire's wear rate. The higher the treadwear number is, the longer it should take for the tread to wear down. For example, a tire graded 400 should last twice as long as a tire graded 200.

Traction Letter - indicates a tire's ability to stop on wet pavement. A higher graded tire should allow you to stop your car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA","A", "B", and "C".

Temperature Letter - indicates a tire's resistance to heat. The temperature grade is for a tire that is inflated properly and not overloaded. Excessive speed, underinflation or excessive loading, either separately or in combination, can cause heat build-up and possible tire failure. From highest to lowest, a tire's resistance to heat is graded as "A", "B", or "C".

1.5.9.2. Information on Light Truck Tires
Please refer to the diagram below.



Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.
LT - indicates the tire is for light trucks or trailers.
ST - indicates the tire is for trailer use only.
Max. Load Dual kg (lbs) at kPa (psi) Cold - indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each axle.
Max. Load Single kg (lbs) at kPa (psi) Cold - indicates the maximum load and tire pressure when the tire is used as a single.
Load Range - identifies the tire's load-carrying capabilities and its inflation limits.

1.6. TIRE SAFETY TIPS

Preventing Tire Damage

- ◊ Slow down if you have to go over a pothole or other object in the road.
- ◊ Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

Tire Safety Checklist

- ◊ Check tire pressure regularly (at least once a month), including the spare (if equipped).
- ◊ Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- ◊ Remove bits of glass and foreign objects wedged in the tread.
- ◊ Make sure your tire valves have valve caps.
- ◊ Check tire pressure before going on a long trip.
- ◊ Do not overload your trailer. Check the Tire Information and Loading Placard or Owner's Manual for the maximum recommended load for the trailer.